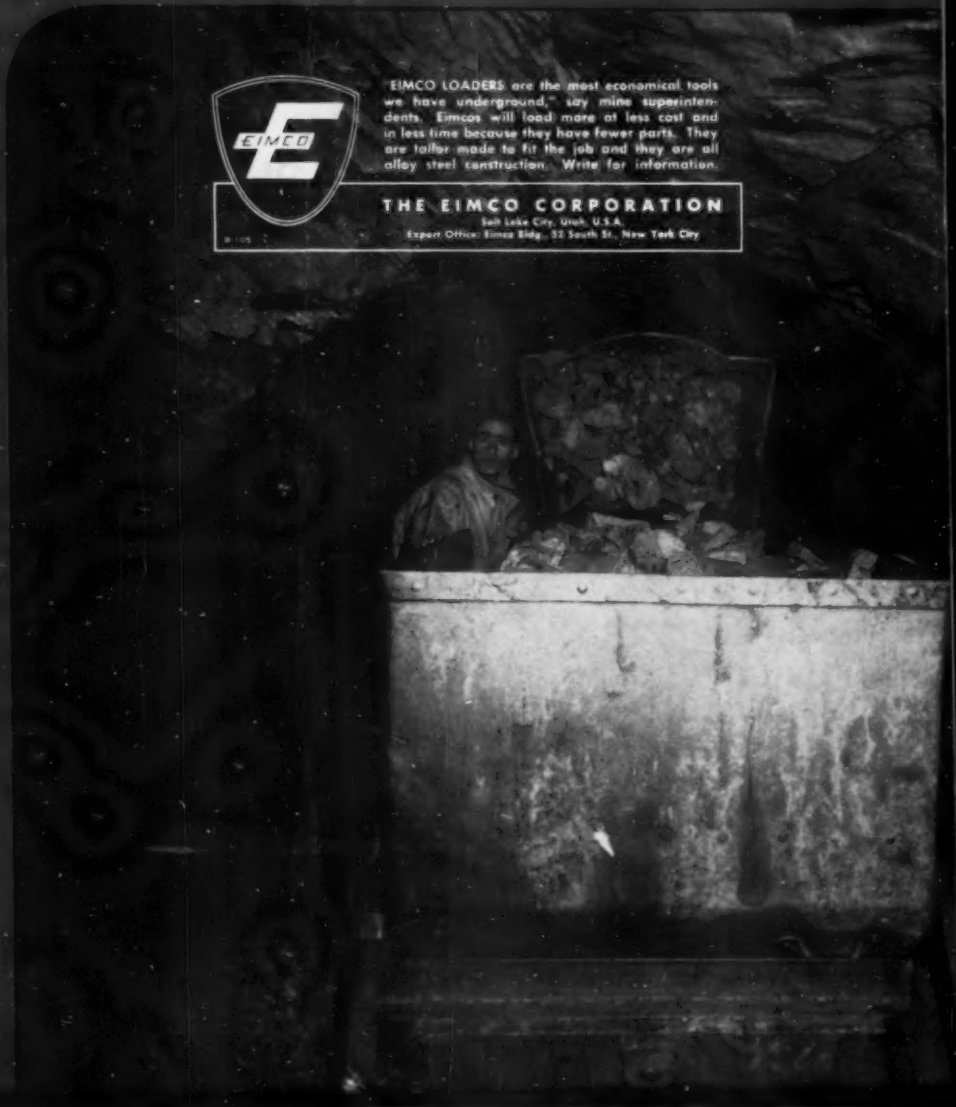
MINING WORLD

in this issue

Tri-State Zinc's Dieselized Mining

Page 44



MARCH 1955

VOL. 17 No. 3

New pumps for Old

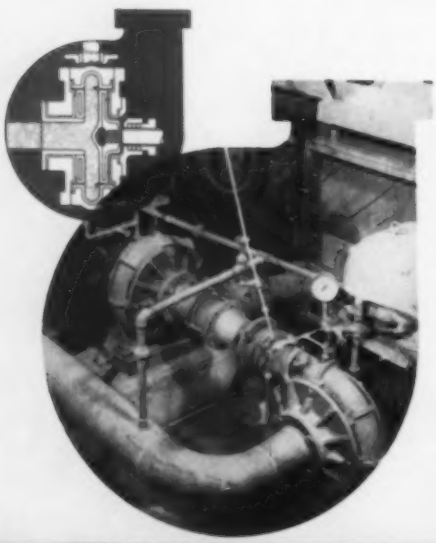
may cost you nothing!

Operating Costs → *Future Savings*

OLD	PUMPING EQUIPMENT	NEW	HYDROSEALS

1/3 to 1/2 less power
Less maintenance costs

If you have old equipment pumping abrasives, it's time you check the operating cost – including power consumption, renewal of parts and downtime for repair. You may well find that excessive costs over a few months equal your capital investment. That revelation will mark your opportunity to improve your pumping and cut future operating costs . . . with efficient, economical Hydroseals.



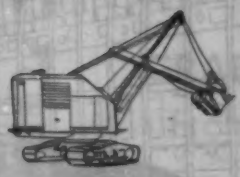
Because a flow of seal liquid protects the close clearance from abrasives, Hydroseals maintain their initial high efficiency throughout pump life. Since over-size pumps & motors are not needed as allowance for wear, you'll use ⅓ to ½ less power than with other new pumps. Furthermore, the Maximix Rubber parts will outlast metal equivalents 4 to 6 times, and cost less.

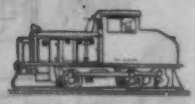
To figure future savings by comparing the present B.H.P. with that of the required Hydroseals, write for Hydroseal Catalog No. 953.

THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.
Representatives throughout the World

HYDROSEAL *and* CENTRISEAL
SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

Caterpillar announces
A NEW LINE OF
TORQUE CONVERTER POWER UNITS





WIDE CHOICE OF POWER UNITS

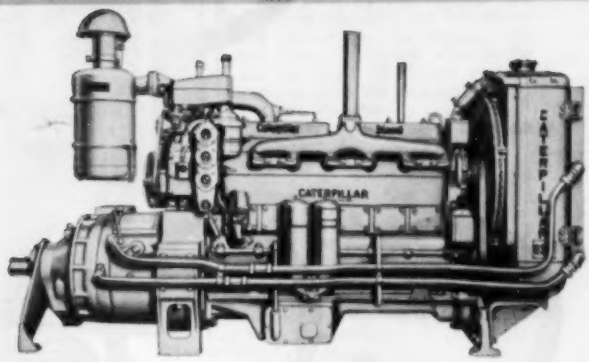
Engine and torque converter
Engine, clutch and torque converter
Engine, clutch, torque converter and reverse gear

WIDE CHOICE OF OUTPUT SHAFTS

Standard heavy-duty drive for side loads
Narrow chain housing for side loads
Wide chain housing for side loads
Output shaft for in-line loads only

Fast Facts About CAT* Torque Converter Power Units

1. **Torque output is automatically matched to the load.**
2. **Loads start smoothly.**
3. **Load movement can be controlled without using the clutch.**
4. **Overloads cannot kill the engine.**
5. **Need no special hydraulic oil—their fluid is engine fuel—fluid level automatically maintained.**
6. **Cat Diesel Engine burns non-premium fuels cleanly and efficiently, even when idling.**
7. **Caterpillar can supply your torque converter requirements from stock.**
8. **Caterpillar Dealers have facilities and parts for servicing torque converters.**



Now, to provide you with a greater selection of power packages, Caterpillar offers a new line of torque converter units. As many as twelve different torque converter arrangements are available for *each* of six Cat Engines, up to 480 HP. Whatever your power needs in excavators, hoists and locomotives, you'll find the right unit in Caterpillar's complete line.

In offering torque converter power, Caterpillar has combined extensive research with years of practical application in the field. Here are owners' reports of units on actual jobs: "Live and snappy with plenty of power" . . . "We get an abundance of power out of these torque converter power units" . . . "Always ready to go."

Either as original or replacement power, it will pay you to check the advantages of torque-converter-equipped Cat Diesels. Each is matched to do *more* work at *lower* cost with *less* down time than any competitive unit. Leading manufacturers of mining machinery can supply these money-makers in the equipment they build.

For complete details about these production boosters, see your Caterpillar Dealer. He has the experience and technical knowledge to help you with your power problems. He has trained personnel who know how to install engines and torque converter power units in mining machinery. Call him today!

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill., U.S.A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS, U.S.A.

Please send me further information on Cat Diesel Torque Converter Power Units

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Company _____

Street _____

City _____ *Zone* _____ *State* _____

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edison self-service

FOR

FAST, ECONOMICAL LAMPROOM OPERATION

The miner serves himself! In seconds he has his lamp off the rack, on his belt, and is ready for his shift. And the same holds true when the shift is over. Add it up . . . Edison Self-Service pays off in maximum lamproom economy.

We will be happy to show you how Edison Self-Service can bring economy and efficiency to your lamproom. Write or call for details.

Edison Double Filament Bulb means continued, full light

See that double filament in the bulb? It's your proved protection against lost time for the miner, and a short crew for the foreman. If one filament burns out, a turn of the switch restores continued, brilliant, full illumination—*working light*, not just emergency light!

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SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service . . . our job is to help you!

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Mining World

Including the Export Edition **WORLD MINING**

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Cover Circle: At Tri-State Zinc, Inc. operations near Galena, Illinois, Dumptors pass on their way to and from the mine and mill. Notice that the Dumptors do not turn around, but travel with the load of ore in front on the way to the mill, and with the empty box in the rear on the return trip to the mine.

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GRAB SAMPLES From the Mail

Realistic Account

Dear Sir:

In the December 1954 issue of the Mining World the article "Uranium Mining Goes Deeper" starting on page 40 gives a most interesting and especially realistic account of what to expect under the conditions as described.

The romance of uranium is certainly here for the man in the street. Down here the Gieger counter is found in the hands of the most unlikely people. Yellow rocks from this area are brought to me almost every day for testing. The hardware dealer in Bisbee who is the agent for one kind of Geiger counter can't keep up with the demand.

CARL TRISCHKA
Geologist and Mining Engineer
Warren, Arizona

Editorial Required Reading

Dear Sir:

Thank you for sending me the tearsheet from MINING WORLD, Volume 13, March 1951, page 5, showing the sinkings of American merchant ships by German submarines during World War II.

You may be interested to know that your editorial and this map have been a "must" reference on the reading list for my course "The Geographical Aspects of Business" which I give in the Graduate School of Business.

C. LANGDON WHITE
Professor of Geography
Stanford University
Stanford, California

Rand Gold Table For Florida?

Dear Sir:

In your January 1955 issue of MINING WORLD, the writer came upon a very interesting article "How New Table Recovers Fine Gold" at the Rand Leases (Vogelstruisfontein) Gold Mining Company Limited.

I would like to write the company to determine whether this particular type of table would recover heavy mineral beach sands and in this way would be suitable for my Florida operations on the east coast.

In addressing my letter what would be the best address to use?

FREDERICK A. HAUCK
President
Continental Mineral Processing Corporation

The firm's head office is: Anglovaal House, 71, Fox Street, Johannesburg, Union of South Africa. Ed.

What Are Industrial TV Sources?

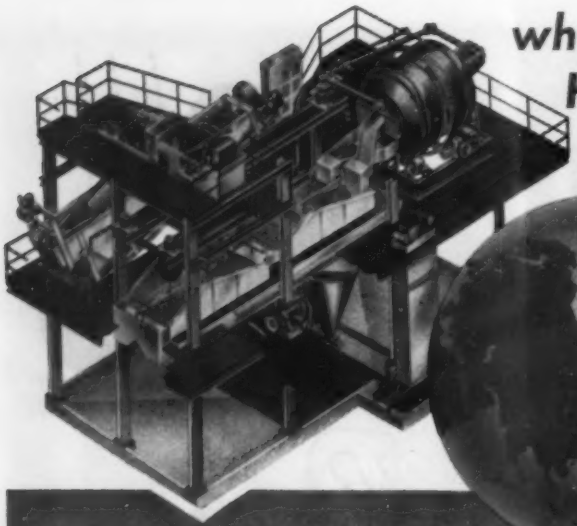
Dear Sir:

Please wire collect best source to contact regarding suppliers of industrial television per your January article on Calumet and Hecla Centennial shaft.

J. S. Wright
San Francisco Chemical Company
Montpelier, Idaho

Industrial TV at Calumet is Utiliscope manufactured by Diamond Power Specialty Corporation, Lancaster, Ohio. Graybar Electric Company, Inc., New York 17, has industrial TV cameras. Ed.

Conn. Executive, advertising and editorial offices, 121 Second St., San Francisco 5, California. Subscription in United States, North, Central and South America, $3.00 per year; other countries, $4.00 per year. Entered as second class matter Oct. 10, 1951 at the Post Office at Bristol, Conn., under the Act of March 3, 1879. Postmaster: please send notice 3579 to MINING WORLD, 121 Second St., San Francisco 5, Calif.



when you consider HEAVY MEDIA SEPARATION remember:

OVER 50% of all HMS PLANTS are WEMCO MOBIL-MILLS

Approximately 185 Heavy-Media plants have been placed in operation or are under construction throughout the world. Of these, 100 are Wemco Mobil-Mills located in 18 states and 15 foreign countries and having an aggregate rated capacity of **50 million** tons annually. Here is remarkable proof of Wemco's design know-how and extensive experience in the Heavy-Media Separation field.

Consistent, economical concentration of ores amenable to Heavy-Media Separation is offered by the Wemco Mobil-Mill. The superior design of this unit gives accurate control of media density and positive sink removal. It assures higher grade concentrate and lower tailings with operating costs as low as 15 cents per ton of feed. A partial list of ores being efficiently treated by Wemco Mobil-Mills includes:

LEAD	COPPER	MANGANESE
ZINC	DOLOMITE	COAL
IRON	BARITE	AGGREGATES
FLUORSPAR	BRUCITE	DIAMONDS

CUSTOM BUILT PLANTS

Wemco's extensive engineering and equipment experience is your assurance of our ability to design and install complete custom built beneficiation plants for any type mineral amenable to concentration by Heavy-Media Separation.

RENT OR PURCHASE WEMCO MOBIL-MILLS

Take advantage of Wemco's rental, rental/option to purchase, or outright purchase plans.

Write today for Bulletin M-3-M-5 and further information on the use of Mobil-Mills in mineral engineering practices.

Mobil-Mills • Cool Spirals • HMS Thickeners • HMS Pumps • Sand Pumps • Agitators Cone Separators • Drum Separators • Hydroseparators • Fagergren Laboratory Units Fagergren & Steffansen Flotation Machines • S-H Classifiers • Attrition Machines HMS Laboratory Units • Dewatering Spirals • Thickeners • Conditioners • Densifiers

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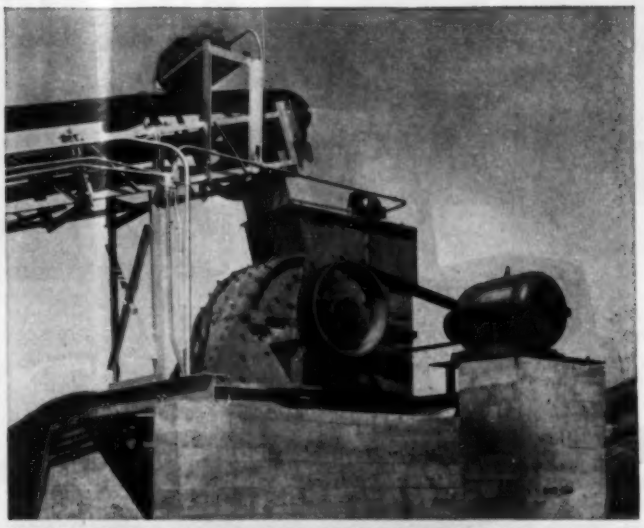
Check these important MOBIL-MILL features

- Prefabricated, ready to install.
- Fast installation at the plant site.
- Minimum initial and operating costs.
- Clean separation, higher recovery.

Mobil-Mills are furnished in five basic sizes and several models with smaller or larger plants varying in capacity from 5 to 275 TPH. Each plant is equipped with a choice of one of the following type separators to meet your particular requirements:

1. **WEMCO SINGLE DRUM** gives positive sink removal and efficient control of media density for one stage separation over a wide range of size fractions.
2. **WEMCO TWO-COMPARTMENT DRUM** gives two stage separation in a single unit for treating ores having a middling component.
3. **WEMCO CONE SEPARATOR** gives efficient, low cost separation with ores where a finer range of feed sizes requires greater volume of medium.

Jeffrey Mud Hog Crushers end plugging problem



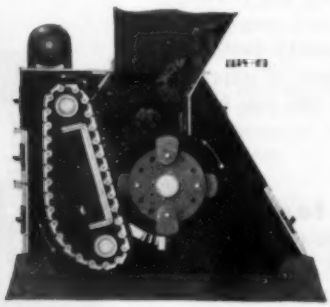
Heavy Duty Mud Hog Crusher reducing wet, sticky clay. Jeffrey belt conveyors feed the raw material to crusher and deliver crushed product to processing plant.

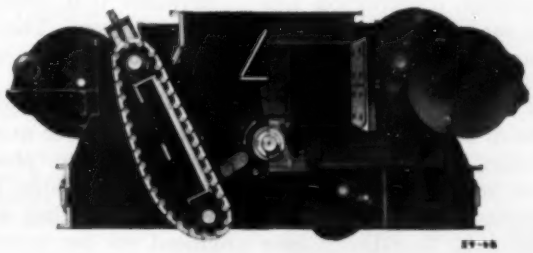
Jeffrey Mud Hog Crushers are specifically designed to crush all types of wet, sticky materials *without plugging* when fed at a uniform rate in proportion to their capacity ratings. Adjustable traveling manganese steel breaker plates convey the material directly into the path of the hammers, and discharge at the bottom. Heavy steel construction provides maximum reduction with minimum wear.

WIDE RANGE OF SIZES

Jeffrey Mud Hog Crushers are built in single direction types in various sizes for medium and heavy duty service, and in heavy duty reversible types. They are giving highly satisfactory service in brick and clay plants, chemical plants, power plants and other related industries. Complete specifications on these machines are contained in the new Jeffrey Bulletin 864.

Cutaway view of Medium Duty Mud Hog Crusher at work on coal, which can be reduced to 85% minus ¼". Note clean-sweeping action of hammer travel.





Cross-section of Heavy Duty Reversible Mud Hog Crusher, equipped with two traveling breaker plate assemblies and reversible rotor.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

EXPORT DIVISION

Columbus 16, Ohio

Cable Address: "Jeffrey — Columbus"

Sales Agents Throughout the World

NEW

35 ton Rear-Dump

Model B Tournapull Rear-Dump is a new machine completely designed and built by the new LeTourneau-Westinghouse Company. Developed by our engineering and research staff, it was built after careful study of today's hauling unit requirements. Its design is based on eight years of experience with our revolutionary rear-dump units.

Hundreds of these earlier units are at work today . . . in mines, quarries, collieries, construction jobs . . . anywhere that material is being hauled by modern methods and modern equipment. They have been highly successful, as proved by our list of re-orders from old customers.

In the new machine, the Model B prime-mover powering the B Rear-Dump is a big powerful tractor engineered for quick and easy accessibility of all components. Every part has a "plus" safety factor to give you the most rugged hauling unit ever built. Dozens of improvements, large and small, give you a hauler that does the job better than any Rear-Dump ever produced.

10 forward gear speeds: 2, 4, 6, 8, 11, 16, 19, 24, 28, 34 mph . . .
2 reverse speeds: 2, 4 mph.

Check these features:

High speed matched to haul conditions

Tournapull B Rear-Dump has 10 forward speeds to 34 mph. Operator easily selects gear which gives him top speed. Double-clutching has been eliminated by addition of clutch brake for faster, easier shifting. Rapid shift and snappy acceleration of 300 hp diesel engine lets you move rapidly into higher gear ranges.

Improved gradability

Better distribution of weight forward onto drive wheels allows "B" to go up steeper grades than previous models could. This improvement, plus selection from 10 forward speeds, plus ample horsepower gives you a unit that can climb at reasonable speed up any grade normally found on any mine, quarry, or construction job.

LET

A Subsidiary of
Westinghouse Air Brake Company

Non-stop U-turns in 35′

2-wheel prime-mover turns 90° right or left . . . machine in normal use makes non-stop 180° turn in space only 35′ wide. With bowl raised (which shortens wheelbase from 21′ to 12½′), "B" turns around non-stop in space only 27′ wide. This extreme maneuverability enables you to work in tight quarters where smaller conventional haulers often cannot go. You save time on any job at both shovel and dump because Tournapull can position faster . . . rarely needs to jockey back and forth like conventional haulers.

Easy loading

Big wide "target" area makes for fast loading cycles. Bowl is 17′8″ long, 10′2″ wide, has maximum depth of 7′6″. Rear of body provides wide, low entry for dipper to give extra speed advantage for the excavator. Low entry, plus wide body, reduces spillage. Rig carries 35 tons, 23 yards struck, 27 yards on 2-to-1 heap, without sideboards.

Fast dumping

Body raises to vertical position at touch of dashboard switch. Inside of body is completely streamlined. No material rides back to shovel or dragline to steal payload room on next trip. Edge of bowl swings behind and below rear wheels so rocks cannot roll forward to lodge against wheels nor can material pile under rear end.

Better flotation

Low-pressure tires more than 2 ft. wide and 7 ft. high, both front and rear, give excellent flotation. You get better traction than with other rubber-tired haulers because these broad pneumatics, with their low pressures and thick, deep lugs, have more gripping surface than duals. These features, plus power-transfer differential and power steer, take Tournapull through soft going *loaded* where other haulers with their narrow tires cannot go empty. Unit uses four 27.00 x 33's, 30 ply, as standard . . . tires *and* wheels are interchangeable between front and rear.

Rugged construction

Body is heavy steel plate, rigidly reinforced with box-beam ribs. Gussets are included for extra support at points of special stress. Slanting surfaces of scoop-shaped body take blows at an angle and tend to quickly establish a load cushion to protect the floor. Bottom consists of 2 layers of heavy steel plate separated by thick steel billets to absorb loading shocks. Floor is faced with welded-on tool-steel strips to resist wear. Main case of prime-mover is built extra strong . . . will not distort to put strain on power-train.

Simple, positive electric control

Fingertip electric control of hoist and steer gives fast, positive action. Big advantage of electricity is that motors can be placed at point of action . . . there's far less power loss than with other control systems . . . no leakage or pressure problems . . . less maintenance. Push-buttons on dashboard operate dump at touch of fingertip.

Lower maintenance

Problems of conventional rear-dumps are eliminated by simple design of B Tournapull Rear-Dump. You have no troublesome hydraulics, no long driveshafts, no springs, spring hangers, no hinged steering-connections. Owners all over the world report exceptionally high mechanical efficiency and low maintenance.

Greater safety

Heavy-duty air brakes provide a total of 7536 sq. in. total braking surface. That's more braking surface on each wheel than most haulers have on the whole machine. Smooth and powerful, they provide safe control in any weather . . . improve maneuverability . . . give operator confidence for faster operation on steep grades, narrow, winding haul roads. Optional electro-

tarder that puts an electrical resistance on generator power circuit provides additional braking action and saves wear on service brakes. Parking brake locks transmission output shaft for simple, sure braking action.

Job-proved prime-mover

17 years' experience on thousands of installations is behind the famous Tournapull 2-wheel prime-mover. Its design gives you power steering through geared kingpin coupling prime-mover and hauling unit. You also get the exclusive Tournapull power-transfer differential which automatically transfers power from slipping drive wheel to drive wheel on firmest footing.

Profit-making interchangeability

You can interchange Rear-Dump with Scraper, Bottom-Dump, Flatbed, or Crane. Each additional trailing unit costs only about 25% of original total price. You save money because all you need buy is trailing unit body . . . rear wheels, tires, and brakes may be interchanged.

You'll want to learn more about all the advantages of the remarkable new Model B Tournapull Rear-Dump. Ask your LeTourneau-Westinghouse Distributor for all the details.

LeTourneau-Westinghouse Company

PEORIA ILLINOIS

TACONITE...

and Symons® Cone Crushers

● SYMONS® CONE CRUSHERS . . . *the machines that revolutionized crushing practice* . . . have long proved their efficiency, dependability and economy in the profitable reduction of ores and minerals the world over. In the case of *TACONITE,* one of the hardest and toughest of all ores to process, the mining fraternity again depends on Symons Cone Crushers for the economical production of large tonnages of Taconite Iron Ore . . . as evidenced by the many Symons Cones in successful service, or on order, for the leading producers of Taconite Iron Ore in Norway and in the Lake Superior Iron Ore region.

While *your* crushing problems may not involve Taconite, you may be sure that the crushers used for processing this extremely hard material are the logical choice for practically any other large capacity ore and mineral reduction job.

NORDBERG MFG. CO., Milwaukee, Wisconsin C254

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

SYMONS PRIMARY GYRATORY CRUSHERS

MINE HOISTS

GRINDING MILLS

SYMONS VIBRATING GRIZZLIES and SCREENS

DIESEL ENGINES

View shows two of several 7' Symons Super Heavy Duty Short Head Cone Crushers installed in the Lake Superior region.

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PEORIA ILLINOIS

FILLS TRUCK FAST with rich payloads from pockets that run 50 percent iron ore. Rugged INTERNATIONAL crawler with 41 drawbar horsepower loads out fast, moves to new locations quickly, makes recovery of ore from widely scattered pockets profitable for the large and small strip mines.

LOW-COST WAY TO STRIP OVERBURDEN FAST—with TD-9 powered Skid-Shovel that gets right down to payloads, moves heaped loads in high gear at ground level and keeps a big fleet of haul trucks rolling to make the operation profitable.

Strip Miner Cleans Up Rich Pockets

Fast-Moving INTERNATIONAL DROTT Skid-Shovel keeps 15 trucks busy, gets from pocket to pocket quickly

How to clear, strip and load out rich, but widely scattered, iron ore deposits profitably—that was the problem facing Alabama's Greenville Mining Company. President Eric Cumbie found the answer in an INTERNATIONAL DROTT TD-9 Skid-Shovel. This unit not only clears and strips but loads out so quickly it keeps a fleet of 15 haul trucks rolling. In addition, it moves from pocket to pocket fast, cleaning them out in a hurry.

That's why the head of this mining company reports:

"Using INTERNATIONAL *crawlers is a profitable experience. We find them powerful, productive and economical to maintain!"*

The TD-9 is but one of eight INTERNATIONAL diesel and carbureted crawlers that can power your mining operations more efficiently . . . with extra lugging power under overloads . . . with all-weather starting . . . with full-pressure lubrication systems . . . with efficient, closed system cooling . . . with accurately metered fuel injection for outstanding fuel economy . . . with unit construction that speeds servicing and maintenance.

Your nearby INTERNATIONAL Industrial Power Distributor will gladly demonstrate—you name the day!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL®
INDUSTRIAL POWER
MAKES EVERY LOAD A PAYLOAD

Reduce the Cost of Ore Reduction

WITH TRAYLOR TYPE H JAW CRUSHERS

For operating economy you can't beat a **Type H Crusher.**

The real payoff with Type H operation comes from the efficiency of Traylor's curved jaw plates. This original Traylor development has tripled jaw plate life over that of the conventional straight plates . . . reduced power requirements amazingly and practically eliminated choking and packing in the crushing chamber.

They are efficient . . . rugged . . . and dependable. Welded steel plate frame . . . simplified swing jaw suspension . . . sturdy cast steel pitman . . . provide trouble-free operation to cope with the heaviest production schedule.

Traylor Type H performance is a "buy-word" with mining men throughout the world. Send for Traylor Bulletin #5105 and see why.

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. . . just mention the Traylor Equipment that interests you.

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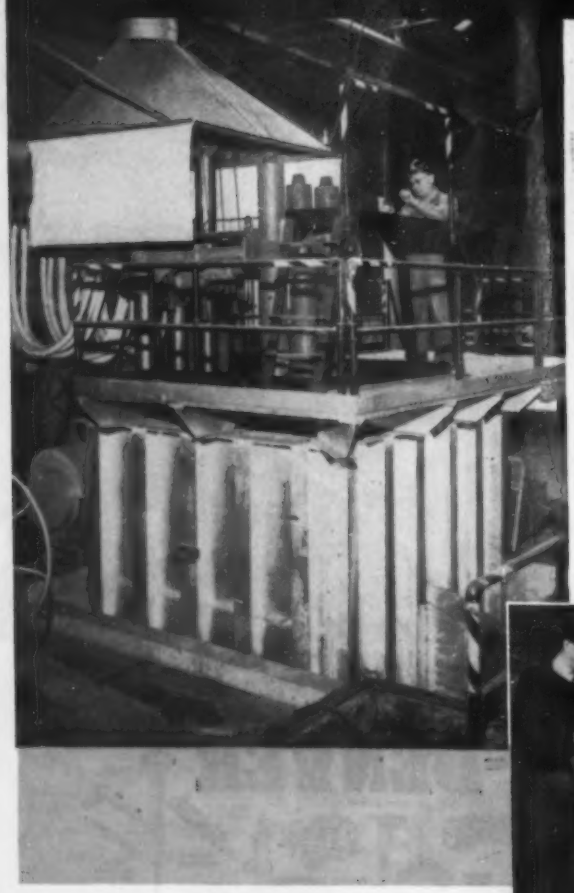
All industry profits by this research at these five branches of the U. S. Bureau of Mines

Lectromelt furnaces are important tools in this work



BOULDER CITY, NEVADA

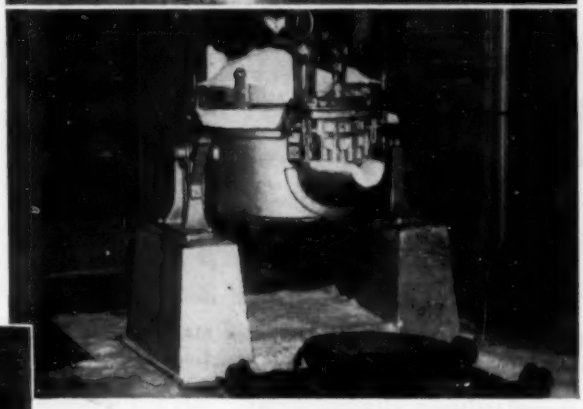
In this 500-KVA Lectromelt-equipped furnace, development work started in a smaller Lectromelt-equipped electric furnace is continued. Problems include the evaluation of agglomerated domestic chromite concentrates for production of ferrochrome, and research on production of ferromanganese from off-grade concentrates.

SALT LAKE CITY, UTAH

After new ideas have been tested in a smaller Lectromelt Furnace, they are stepped up to a pilot plant basis in this Type U Lectromelt Furnace. Here smelting rates, power and electrode consumption and refractory life can be determined. Problems have involved the smelting of low-grade nickel ores, of titaniferous magnetite ore, manganese concentrates and of rhodonite.

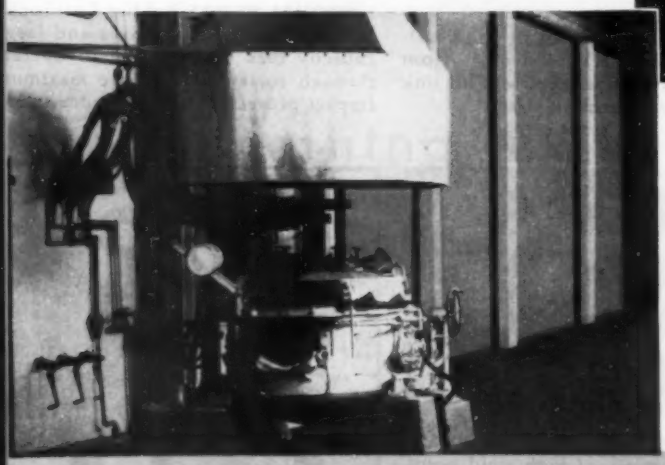
ALBANY, OREGON

A Type W, single-phase Lectromelt Furnace is used for preliminary smelting tests. A Type ST, 3-phase Lectromelt Furnace melts and refines metals and alloys produced in a continuous electric smelting furnace of the Bureau's own design. This picture shows refined cobalt being poured into water to granulate the metal to meet GSA specifications.



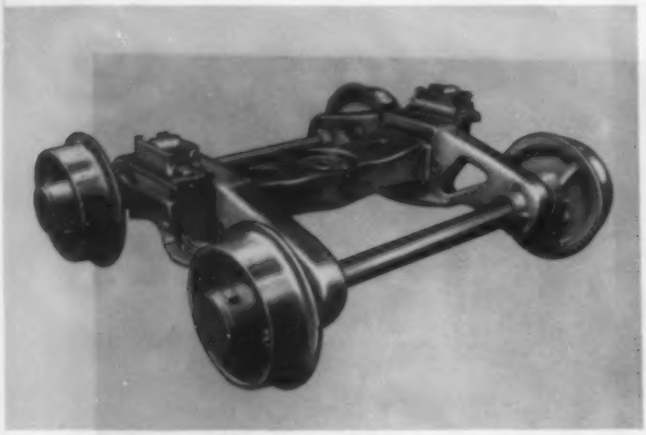
ROLLA, MISSOURI

This 100-KW Lectromelt Furnace is used for pyrometallurgical investigations such as these: Processes for separating titanium oxide from ilmenite or rutile ores . . . for separating cobalt, copper and nickel from a complex matte, or as a combined smelter-converter in extracting these metals from a pyrite concentrate . . . in experimental smelting of low-grade iron ores.



PITTSBURGH, PENNSYLVANIA

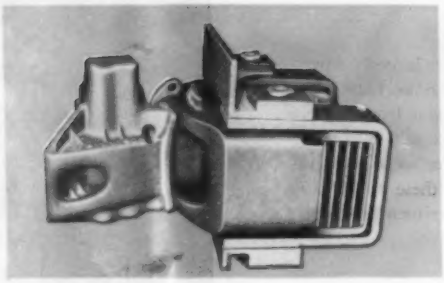
The Pyrometallurgy Laboratory of the U. S. Bureau of Mines will soon install this Type ST Lectromelt Furnace (originally located at the Bureau's Redding, California Station) to enlarge the Pittsburgh Laboratory's research facilities.



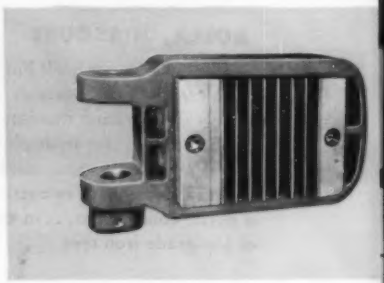
NATIONAL equipment cuts per-ton costs

NC-1 MINE CAR TRUCK is the latest example of National's pioneering in better equipment. Among NC-1 truck advantages are longer and softer ride springs, friction damping mechanism that controls vertical and transverse oscillations, automatic frame alignment and cast one-piece bolster with large lubricated center bearing. A-3621

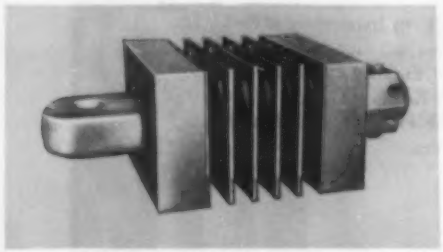
WILLISON AUTOMATIC COUPLERS save time with maximum safety, couple at either end of car or locomotive, require no manual assistance, eliminate damaging slack, permit high speeds with maximum stability.



NATIONAL MI-235 Rubber-Cushioned Draft Gear primarily used in Willison spherical-horn coupler assemblies for drop-bottom cars and locomotives; are effective with link and pin bumpers and in strap yokes.

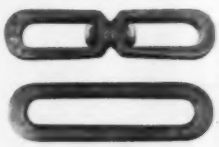


NATIONAL MI-225 Rubber-Cushione Draft Gear for locomotives and larg capacity cars not required to operat through rotary dump. Give maximu impact protection in minimum spac



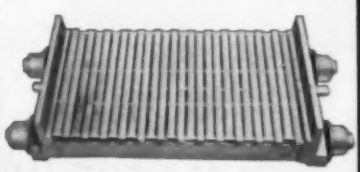
NATIONAL MI-230 Rubber-Cushioned Draft Gear for cars in rotary dump service. High-capacity rubber pads with soft initial action provide maximum impact protection, lengthen equipment life. Available in capacities and designs to fit individual requirements.

NACO STEEL WHEELS, made from quality-controlled Naco cast steel—of high yield point, great tensile strength and ductility—reduce tread spalling or flange breaking. Available in all sizes regularly used in mining or industrial operations.



NACO STEEL SWIVEL HITCHING AND LINK

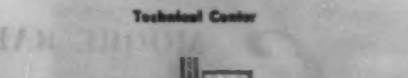
CAST ALLOY STEEL ORE-GRINDING BALLS



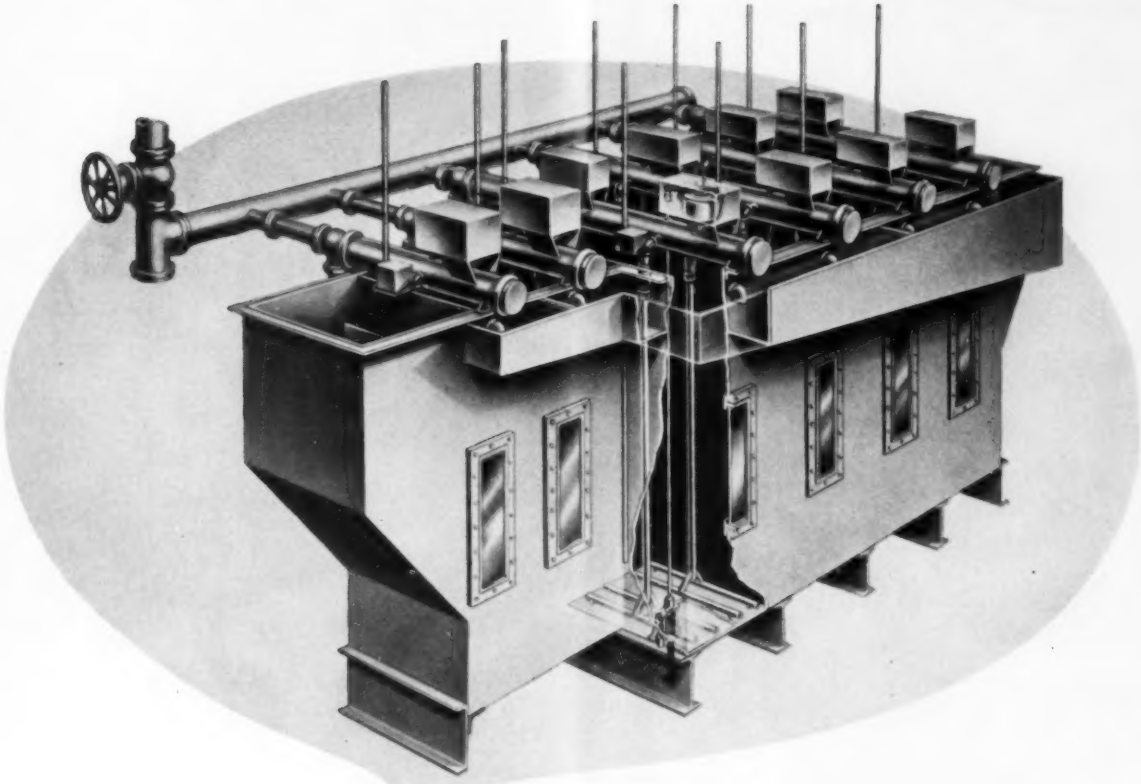
CAST STEEL PALLET AND MALLIX SINTERING BARS

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY • Cleveland 6, Ohio

Technical Center



Progress through Research



Something **NEW** has been added

to the DORRCO SIZER

Completely re-designed unit makes more effective use of hydraulic water to produce clean deslimed fractions sized within narrow limits.

For those applications where hydraulic classification is indicated for the sizing or grading of minus 8 mesh pulps the new Dorrco Jet Sizer is the answer.

What's new about the Jet Sizer? First, a new — and more efficient — water distribution system which both reduces initial cost and simplifies maintenance. Second, extreme flexibility of cell arrangement — through which 1½ to 21½ pockets can be arranged in series or in banks in virtually any combination.

Continuous product discharge is controlled by a fully automatic system requiring a minimum of operating attention. Low operating costs result from negligible power requirements and inexpensive low head hydraulic water.

If you'd like more information on the Jet Sizer write for a copy of Bulletin 2342 available at no obligation from Dorr-Oliver Inc., Stamford, Connecticut.

In Canada: 26 St. Clair Ave. E., Toronto 5.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

At Anaconda, we know firsthand the enemies of cable life: water, abrasion, excess tension, run-overs—in our own mines. This experience helps us make better cable for *your* mine use.

Get 300% longer service with Anaconda mine-tested cable

Day-in, day-out mine experience helps us make shuttle car cable that really resists enemies of cable life.

Users tell us today's Anaconda flat-twin cable lasts *3 times longer* than the cable they used only a few years ago. What makes this Anaconda cable better?

Its jacket is specially compounded neoprene. You can't tear, cut or abrade it easily. Insulation is a new crush-resistant form of rubber, making this cable tougher and vastly more flame-resistant. And an improved stranding and a brand-new ground wire make it a lot safer to handle.

Your Distributor can give you full facts. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Trade Mark 55320

ANACONDA®
MINE CABLE

FLAT-TWIN CABLE

Improved stranding, new insulation, new grounding wire, and neoprene jacket make this a superior cable for shuttle cars, continuous miners, loaders, drill trucks, cutters.

POWER CABLES

AnacondA Types W & G are rugged, sturdy and long-lived. Used for mine power, shovels, continuous miners, loaders, drill trucks, cutters.

SHOVEL AND DRILL CABLES

Securityflex* Types W and G are used with small shovels, self-propelled drill trucks, pumps and a-c mining equipment. For higher voltages, Type SH cables (shielded) are recommended.

SECURITYFLEX CORDS

Unexcelled for strength, wear resistance and long life. Type SO (heavy-duty) provides superior service on remote control and hand drills.

TROLLEY WIRE

FEEDER CABLE BARE OR INSULATED

TELEPHONE CABLE

SHOT-FIRE CORD

WELDING CABLE

Now Available for Uranium • Minerals Exploration

The new Hawthorne Type "E" Replaceable Blade Insert Rock Bits

All-Formation Bits

The regular type "E" bit body is used with the insert blades. The regular reaming stabilizer is optional, as with "Blue Demon" Bits.

U.S. PATENTS
2,615,684
2,666,622
OTHERS PENDING

to increase drilling efficiency...

★ *Drill harder formations faster*

★ *More footage per bit than any comparable rock bit*

★ *Uses regular Type E "Blue Demon" Bit body*

THE new Hawthorne Type "E" Insert Rock Bit, available in sizes from AX to NX, is now improving the efficiency of rotary drilling for uranium and other minerals on the Colorado Plateau.

Made of tough tool steel, and utilizing a special quality of tungsten carbide inserts on the cutting surfaces of the blades, the new bit has demonstrated, in rigid field and laboratory testing, a capacity to efficiently drill all but the hardest formations encountered in minerals exploration.

High toughness of the inserts minimizes breakage, and a special welding process developed by Hawthorne prevents loosening of the inserts while drilling. A unique dressing procedure produces a superior cutting edge, which permits the blades to stay sharp while drilling the harder formations.

Like all Hawthorne Bits, these insert bits were developed on Hawthorne's patented interchangeable, replaceable blade design, permitting the use of many sets of blades with the same bit body. After the blades have been worn away they are discarded and easily replaced, providing the driller with factory controlled "on-the-drill" bit service.

Type "E" Insert Rock Bits are available in the sizes indicated below, with the adapter sub into which the bit shank screws available with box or pin connection to fit any drill rod or collar used in minerals exploration.

Write for illustrated catalog covering complete range of "Blue Demon" Bit sizes for all exploratory drilling requirements.

PRICE PER SET (3) OF BLADES

AX*-1⅞"	2⅜"-BX*	2⅞"-NX*
$20.50	$21.00	$21.50

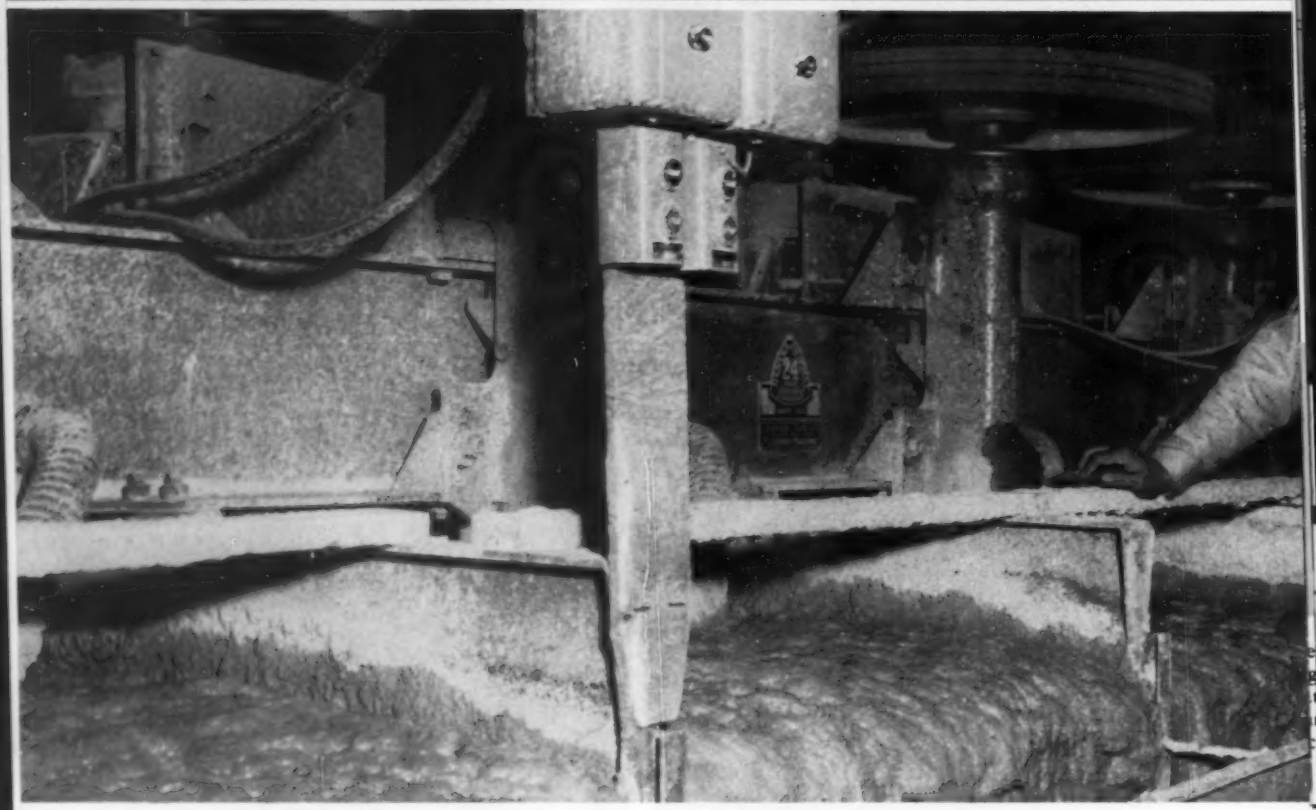
*Denotes stock sizes.

HERB J. HAWTHORNE INC.

P. O. BOX 7366, HOUSTON 8, TEXAS

9510

DENVER EQUIPMENT



This 8 cell No. 24 (43x43) DENVER "Sub-A" Super Rougher Flotation Machine, including installation, paid for itself in less than two months! In June, 1954, this machine was installed at the Glen, Mont., tungsten (scheelite) operation of Minerals Engineering Co. as a scavenger to reduce flotation tailings loss. Treating 333 T/24 hr., tailings were assaying .0577% WO_3. After installing the 8 cell No. 24 DENVER "Sub-A" Super Rougher Flotation Machine, tonnage was increased and tailings assays were immediately lowered to .0516% WO_3. This amounted to

Thorough dispersion of reagents prior to flotation is accomplished by this 12'x12' DENVER (Patented) Super Agitator and Conditioner. Patented standpipe gives positive recirculation of pulp in conditioning cycle, insures intimate reagent contact with pulp particles and higher flotation efficiency. Item No. 323.

When the DENVER Cone Type Dry Reagent Feeder is used to feed dry reagents to a DENVER Conditioner, as pictured above, it can be readily mounted to feed directly into the tank, where efficient dispersion of the reagent and pulp is affected. Feed is easily and accurately controlled. Write for Item No. 324.

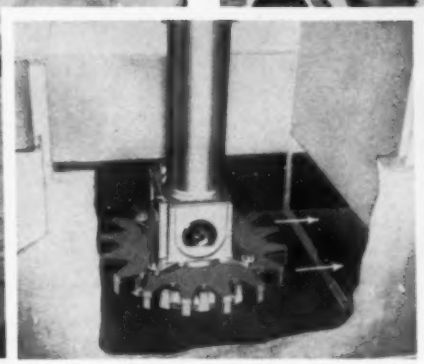
This is the new DENVER Reagent Feeder. Most important new feature is a special inlet float valve so reagents can be easily piped into feeder from a storage drum. Also, two other improvements include a new, precision Hand Wheel adjustment for micrometer accuracy, and a calibrated feed indicator. Write for Item No. 325.

"The firm that makes its friends happier, healthier and wealthier"

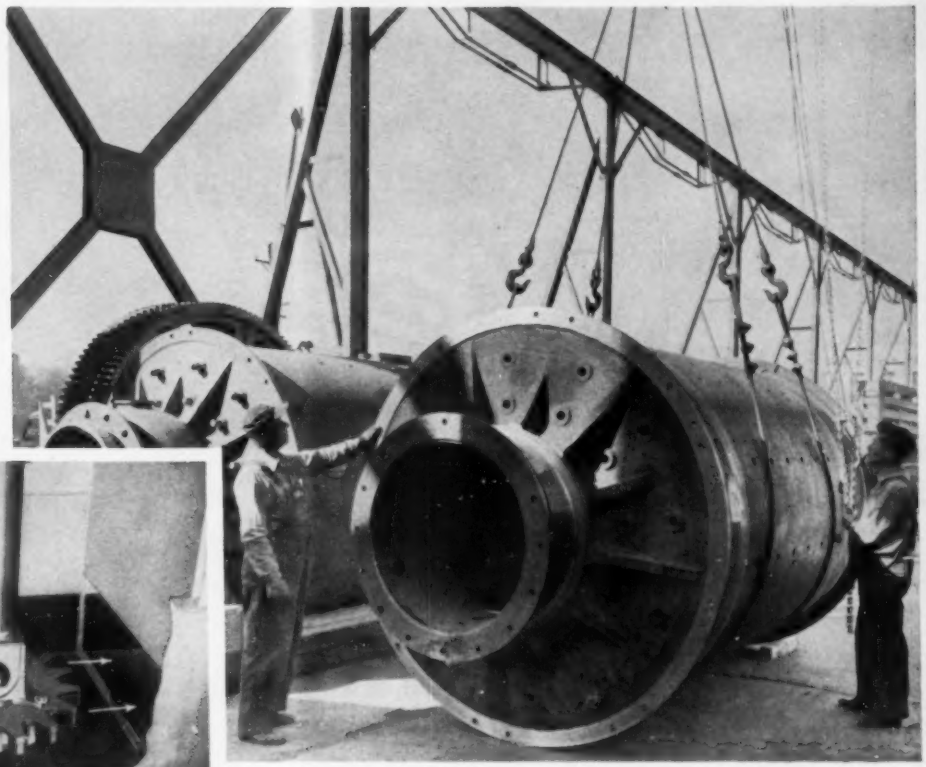
DENVER EQUIPMENT COMPANY

1400 17TH STREET DENVER 17, COLORADO

IN THE NEWS . . .



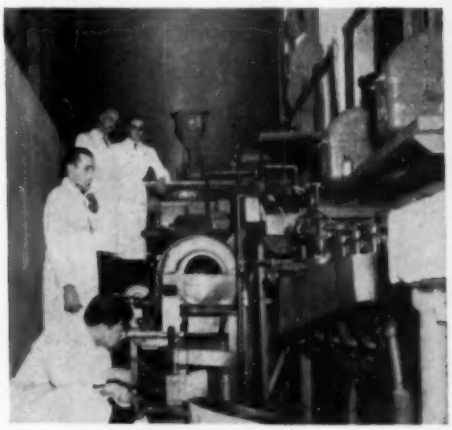
about $300 daily in new profits. Based on these profitable results, Minerals Engineering Co. decided to increase their plant capacity to 600 T/24 hrs. Three additional 4 cell No. 24 DENVER "Sub-A" Super Rougher Flotation Machines are being installed in the new roughing and scavenging circuits. Write for Item No. 321.



DECO machinists prepare two of an order of four 6'x10' DENVER Steel Head Mills for shipment to Spain for use in a 600 T/24 hrs. Cyanidation plant. Each mill is equipped with manganese liners, small diameter trunnion overflow and 125 hp. motors (due to light grinding medium). They are following the African practice of using silica grinding media, rather than forged steel grinding balls. (Each mill will operate in closed circuit with a DENVER Rake Classifier.) Item No. 322.

DENVER Disc Filter has patented segment that gives drier cake by using gravity drainage as well as vacuum. Complete removal of filtrate prevents "blow-back." This 6'-8 disc DENVER Disc Filter is used to reduced zinc flotation concentrates from 30% solids in filter feed to 8% moisture in cake. Write for Item No. 327.

DENVER Equipment Co. bulletins on DENVER Jaw Crushers, DENVER-Dillon Screens and DENVER SRL Sand Pumps contain details on construction, capacities, operating features, related tables and data. If you have not received one through the mail, write for your copies at once. Write for Item No. 326.

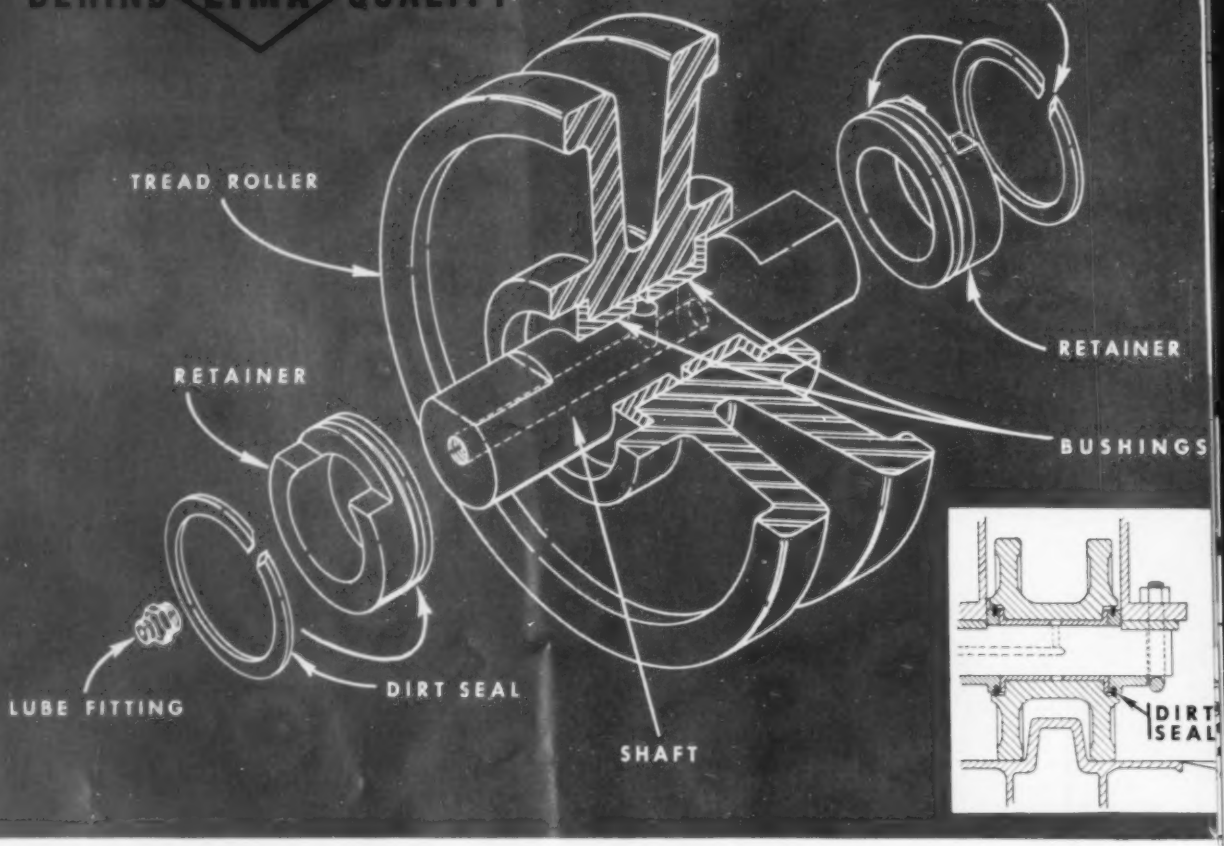


The Colombia National University, Bogota, Colombia, Mineral Pilot Plant was designed and equipped by DECO. It includes complete facilities for selective flotation and gold-cyanide leaching pilot mill and testing work. Technicians were trained in the DECO Laboratory, Denver. For tests and equipment, Item 328.

WRITE TODAY, FOR ADDITIONAL INFORMATION . . . Please request additional information by the Item Number.

COLORADO SPRINGS, 500 South Sawatch Street, Phone MElrose 3-7158
DENVER 17, Box 5268, 1400 17th Street, Cable DECO, Phone CHerry 4-4466.
CHICAGO 1, Bell Building, CEntral 6-2423.
NEW YORK, Empire State Bldg., Cable DECOYORK, Phone Chickering 4-6510.
EL PASO, 201 West 7th Street, Phone 3-8371.
SALT LAKE CITY, P. O. Box 705, Phone 84-8012.
TORONTO, ONT., 220 Bay Street, Cable DECOTOR, Phone EMpire 3-8836.
VANCOUVER, B. C., Credit Foncier Building, Phone Marine 4918.
LONDON, EC2, 15/17 Christopher St., Finsbury Square, Cable DECOLON, Phone Bishopsgate 3575.
MEXICO, D.F., Avenida Juarez 14, Phone 21-1477.
JOHANNESBURG, Broadway & 9th, Bez Valley, Cable DECOJO, Ph. 25-7531.

BEHIND LIMA QUALITY



LIMA dirt seals cut down-time and maintenance costs

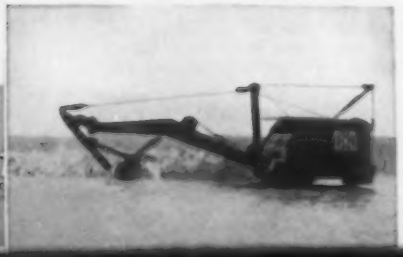
Effective piston-ring-type dirt seals in the tread rollers are another quality "extra" you get when you use a LIMA. Abrasive material which wears out the bushings and shafts of ordinary machines is excluded. LIMA seals the lubricant in and dirt out to reduce friction and prolong the life of bushing, roller and shaft.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-ring-type dirt seal rings and retainers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of the center of rotation.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (optional).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts.

The features listed above contribute to LIMA'S greater output with less down time and lower maintenance costs. Users agree! It costs less to own a LIMA!

This LIMA demonstrates the importance of LIMA'S dirt seals and grease retainers.



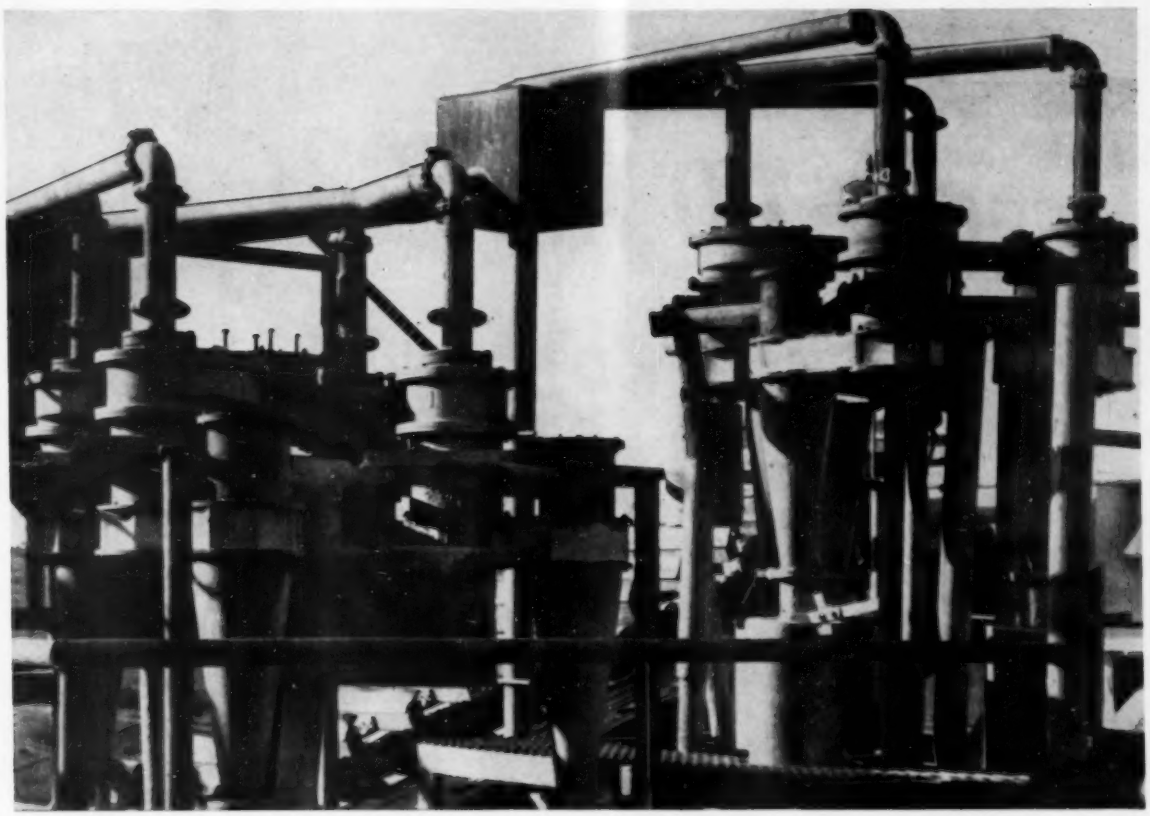
DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

Cable Address: Limashovel, Lima, Ohio, U.S.A.

LIMA SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division · LIMA · OHIO · U. S. A.



KREBS CYCLONES

. . . negligible wear after a year of operation on coarse feed

Krebs Cyclone liners are a special moulded pure gum rubber that far outlasts ordinary porous gum rubber. Literature on cyclones often refers to rubber linings lasting weeks or sometimes only days on feeds as coarse as that listed here. Compare this with the full year service of Krebs Cyclone liners without appreciable wear!

These moulded pure gum rubber liners are dense, smooth and *replaceable* . . . an important factor in simplified and economical maintenance.

Krebs Cyclones are precision made with machined steel shells. Fitted with the pressure moulded liners, their complete weight is far less than cast iron or nihard cyclones. Engineered for an idealized force pattern, Krebs Cyclones in sizes from 4″ to 30″ are available either in single or integral two stage units. Long sweep inlet and adjustable valve are standard on all models. Special designs are available for unusual classifications. All units permit a wide change of inlet size, vortex size and apex valve for changes in objectives.

Feed to cyclones 32% solids

Mesh	%wt.
4	0.3
6	2.6
8	6.9
10	10.0
14	11.2
20	7.3
28	10.2
35	8.4
48	9.5
65	6.3
100	5.2
200	4.6
—200	17.5

Our metallurgical staff and pilot plant facilities are available on request. Details of your classifications are invited.

EQUIPMENT ENGINEERS INC.

41 SUTTER STREET • SAN FRANCISCO 4, CALIFORNIA

"Eucs" SURE DO THE JOB!

Euclid Scrapers—12, 15.5 and 18 cu. yds. struck....180 to 400 h.p. engines... top speeds, loaded to 30 m.p.h.

Bottom-Dump Euclids—13, 17 and 25 cu. yds.... 180 to 300 h.p...top speeds loaded to 35 m.p.h.

Rear-Dump "Eucs"—10, 15, 22, 34 and 50 tons ...125 to 600 h.p...spring mounted or semi-rigid drive axles....top speeds loaded to 36 m.p.h.

On construction and mining jobs the world over you'll hear owners say, "those 'Eucs' make more money for us and do more work than any equipment we've ever used." Operators, too, like "Eucs" because they're easy to handle and have plenty of what it takes to haul and dump big loads in tough going.

There are lots of reasons why men who know earth moving equipment specify Euclids, but they all add up to one simple fact . . . "Eucs" move more loads per hour at the lowest cost per ton or yard of material moved. Profitable performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

When competitors are using "Eucs" to move dirt or rock faster and cheaper than you are, you can't afford to pass up the cost cutting advantages you get in Euclid equipment. For the recommendations of a hauling equipment specialist and a production and cost estimate on your job, get in touch with your Euclid distributor . . . there's no cost or the slightest obligation.

EUCLID DIVISION GENERAL MOTORS CORPORATION **CLEVELAND 17, OHIO**

Cable Yuklid

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

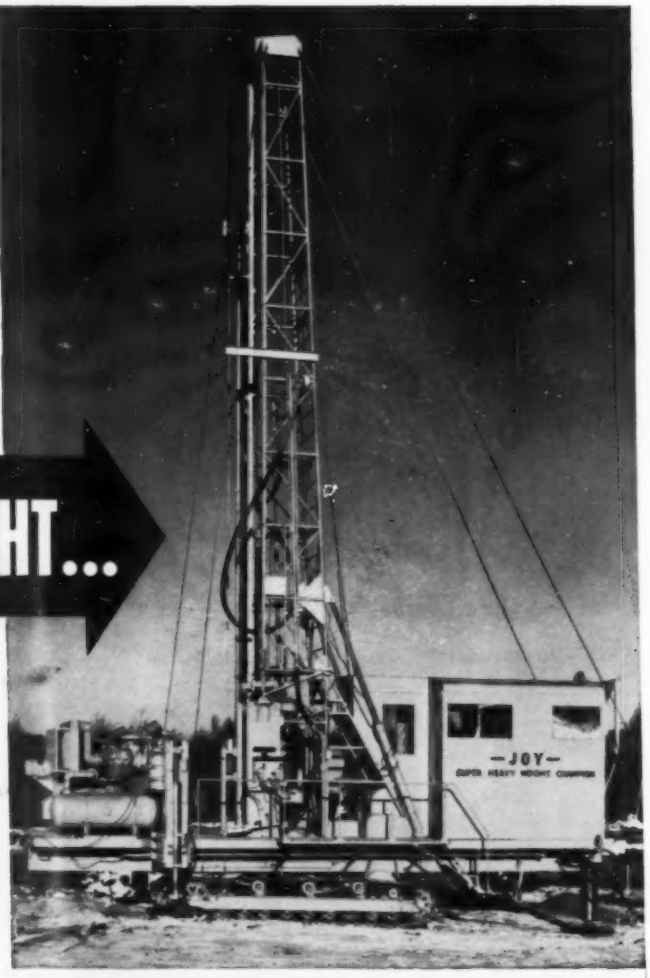
GM GENERAL MOTORS

MEET "BIG BROTHER"

... the New JOY

SUPER HEAVYWEIGHT...

CHAMPION BLASTHOLE DRILL



Here is the new, *larger,* heavier Joy Champion Rotary Blasthole Drill . . . the "big brother" of the Middleweight and Heavyweight Champions, the Joy drills which pioneered revolutionary rotary-air blast drilling. It is designed specifically for large (9″ to 12″) hole-drilling in harder rock.

Proof of its ability to tackle the toughest open cut mining and quarry jobs is the record of the unit illustrated. This Super Heavyweight has been performing very satisfactorily in the hard taconite formations of the Minnesota Iron Range.

The Super Heavyweight is a rugged, heavy duty, low maintenance machine, built to last and produce. Write, now, for complete details to *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

Check these super heavyweight features:

DRILLS DRY . . . No freezing water lines, no costly water hauling.

NO LOST HOLES . . . Rigid drilling stem, controllable feed pressure, infinitely variable rotation speed prevent bit wander.

QUICK SETUP . . . *Hydraulically raised mast* and hydraulic levelling jacks.

DRILLS CLEAN . . . Continuous, instant removal of cuttings by a blast of compressed air.

HYDRAULIC CHUCK . . . Full automatic and self-aligning.

AMPLE WEIGHT . . . Enough to handle big 9″ to 12″ holes.

Consult a Joy Engineer

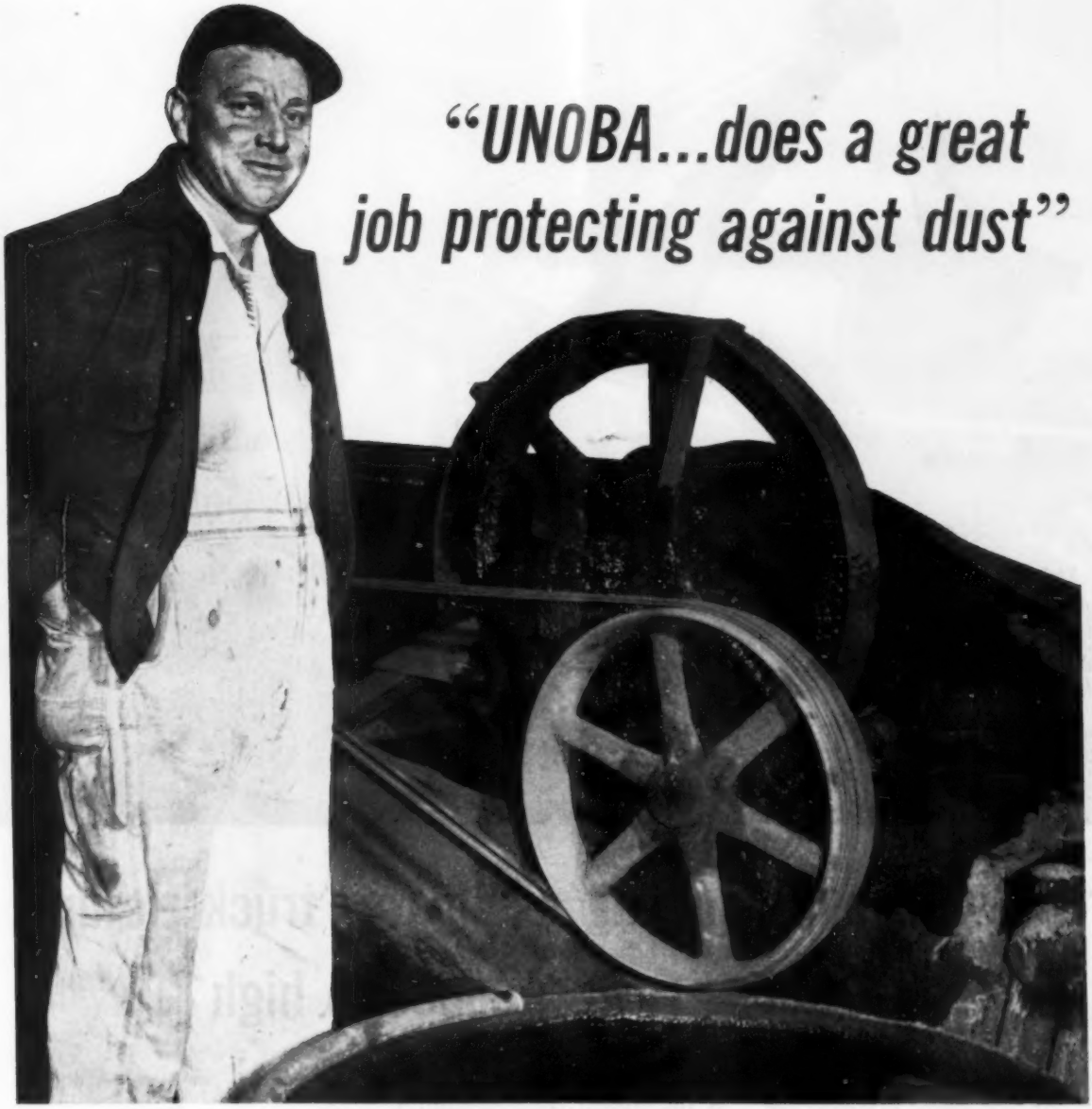
for AIR COMPRESSORS • ROCK DRILLS • WAGON DRILLS
CORE DRILLS • BLASTHOLE DRILLS • PORTABLE HOISTS
FANS • BLOWERS • HYDRAULIC HOSE AND COUPLINGS

W&D M5542

JOY

PIONEER AND WORLD'S LARGEST
MANUFACTURER OF ROTARY BLAST HOLE DRILLS

"UNOBA...does a great job protecting against dust"



R. V. Hamilton, general superintendent, Trout Mining Div., American Machine & Metals, Philipsburg, Montana.

"Extreme dust conditions characterize our operation, the production of grade A battery manganese.

"The abrasive effects of manganese dust on machinery can be a real problem. However, we have successfully solved this one by lubricating with Union's UNOBA F-1. No other grease I know of does such a great job of protecting bearings and other moving parts against dust abrasion. And we can use this same grease everywhere in the mill, even where heat, moisture and acid conditions prevail.

"An example is an open drive shaft in our mill which has been in continuous operation for three years — without UNOBA'S protective film in the pillow blocks this shaft would probably require replacement every few weeks. Believe me, proper lubrication with UNOBA has saved us a lot of time and money since we started using it back in 1949."

If dust is a problem in your operation we suggest that you do as Mr. Hamilton did. Call on your nearby Union Oil representative for UNOBA, the *multipurpose* grease.

UNION OIL COMPANY 76
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • **New York:** 45 Rockefeller Plaza • **Chicago:** 1612 Bankers Bldg. • **New Orleans:** 644 National Bank of Commerce Bldg. **Atlanta:** 401 Atlanta National Bldg. • **Kansas City, Mo.:** 612 W. 47th St.

two-way side dumping eliminates truck tie-ups ... keeps rock production high

Assurance of constant, smooth flow of rock from quarry to crusher and elimination of costly truck delays have been achieved by Buffalo Crushed Stone Co. of Bowmansville, N. Y. through a flexible system of two-way side dumping at the crusher.

The greater flexibility of this system was achieved by converting from single truck units to truck-trailer combinations—thus doubling payload capacity for stepped-up production. Since all the dump bodies are designed for two-way dumping, the trucks can roll in on either side of the crusher. Remote-control overhead dumping system enables one man to control the feeding rate and the crusher operation. Feed is uniform...truck delay is eliminated.

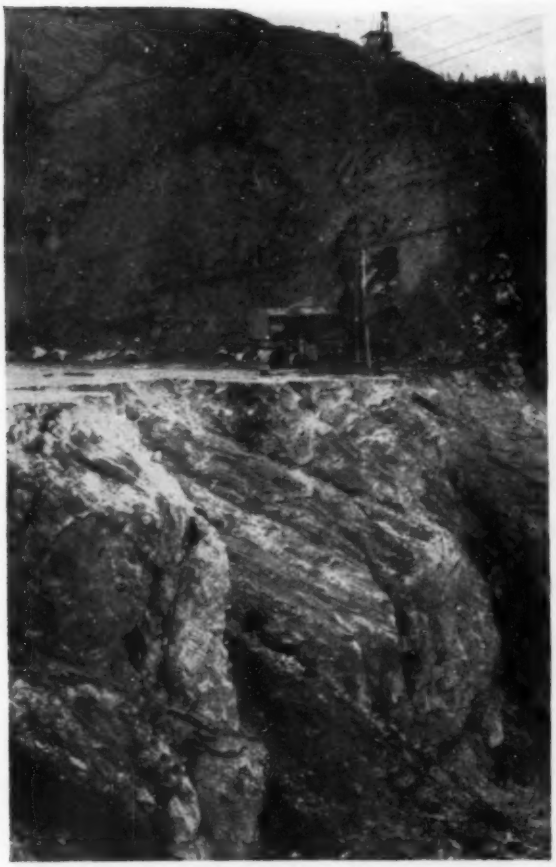
Each of the six trucks hauls 28 tons in two side-dump bodies; 14 tons on the truck and 14 on the trailer. They handle grades up to 10% and roll at speeds up to 27 m.p.h. on the level. Each truck makes 22 trips daily between the quarry and the crusher, hauling a total of 3700 tons and using only 1.2 gallons of diesel fuel per hour per truck.

In switching to tandem operation, Buffalo Crushed Stone Co. knew they had a job calling for trucks that "have what it takes." Result: They bought Macks—six Model B-61 six-wheelers powered by Mack Thermodyne® Diesels, and equipped with heavy-duty Mack transmissions to meet stiff grade requirements.

On your job, too, Mack trucks can make the big difference by hauling more—for less.

2716

MACK TRUCKS Empire State Building, New York 1, N. Y.



you can't knock it down if you don't drill it first

Easily-damaged, undependable cable is not cheap at any price. This is particularly true of open pit mining operations where the economical operation of much expensive equipment rests on its ability to keep working through each and every shift.

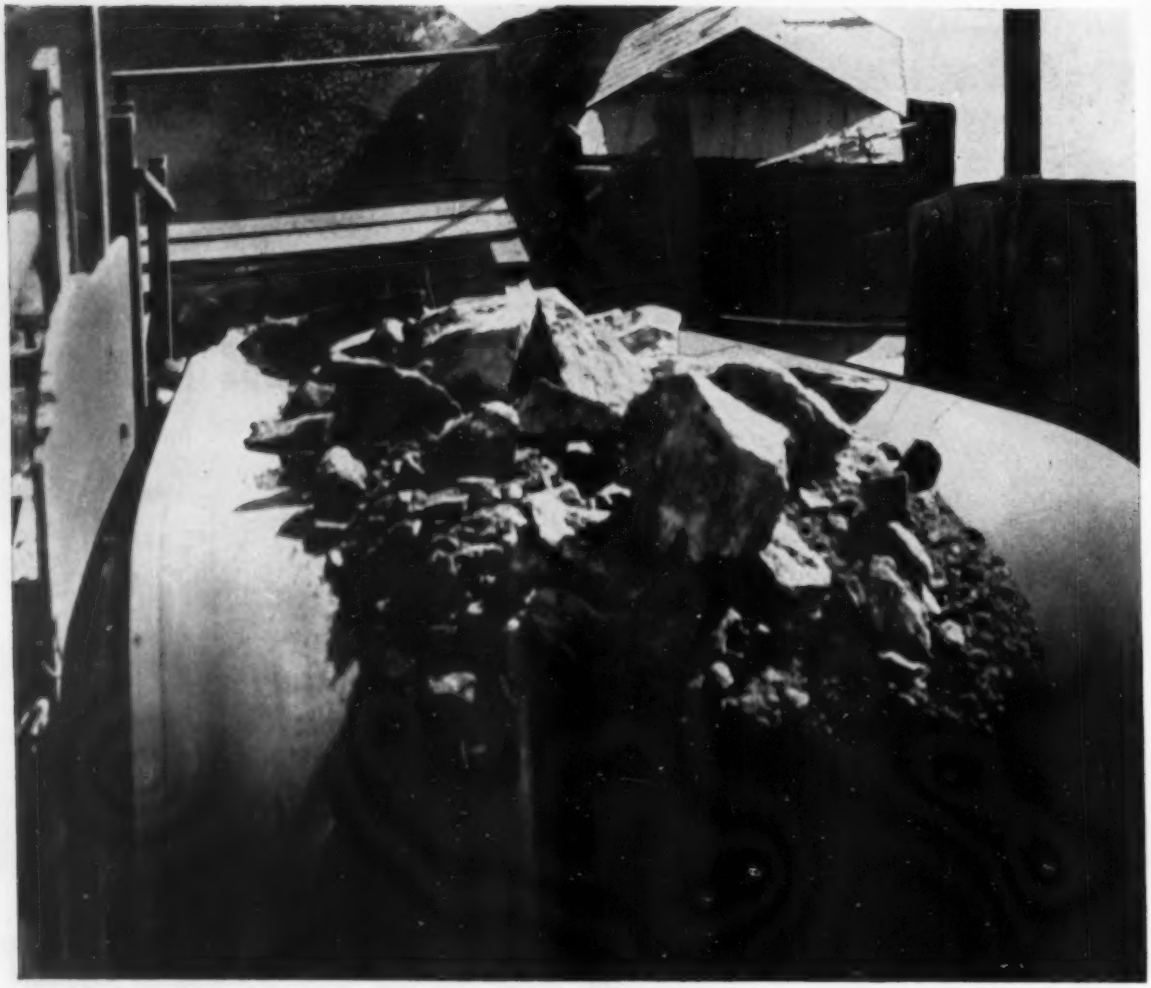
It is in such situations as this that TIREX Cables with their cured-in-lead, Selenium Neoprene Armor can mean the difference between a smooth-flowing job and one with stop-and-go operations. Only smooth-flowing jobs have low costs.

Portable cables are particularly subject to abuse and to deterioration from weather. Since they are the only pathway for power, isn't it just good common sense to buy the best portable cables you can find for powering your drills? That means TIREX, of course. TIREX has the toughest, most abrasion-resistant jacket available on a portable cord or cable. That's why we say be sure you specify and then be sure you get TIREX.

Simplex

TIREX CORDS AND CABLES *are made only by the*

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.



New Conveyor Belt Combines Increased Strength With Extra Flexibility

Rugged Mainliner - Conveyking conveyor belt is engineered for tough jobs involving high tensions, high lifts and long center distances. It's ideal for conveying aggregates, coal and ores. It's steel-like in strength, practically stretchless, yet extremely flexible and troughs easily.

Mainliner belts have about twice the strength of ordinary cotton duck belts of the same gauge. They resist the destructive action of water, oil, weather and age. Why? Because these belts are made of multiple plies of strong duck with Nylon woven across the width and a new-process, high-strength cotton woven lengthwise, with skim coats between plies. They are available in any lengths, with any number of plies, in widths up to 72".

Like other heavy duty belts, these Mainliner Conveyking belts are custom made to meet particular requirements of individual jobs. They can be made with a cover tensile strength of 3500 to 4000 pounds average and a friction pull of 20 to 24 pounds average. They can also be made with a cover tensile strength of 2500 to 3000 pounds and a friction pull of 16 to 19 pounds. They are also available in oil-resistant Neoprene. All are mildew inhibited throughout. A breaker strip can be included in top cover, if specified.

We also manufacture a complete line of industrial rubber products: hose, belting, packing and moulded rubber of every construction for every need. *Through your Quaker and Quaker Pioneer distributor* our research and engineering services are always available to help you solve any industrial rubber problem. *Write for free folder and name of distributor.*

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ELIMINATE TIME-WASTING DRILL STEEL CHANGES!

You can quickly interchange both TIMKEN® rock bit types on the same drill steel—right on the job

TIMKEN® multi-use and carbide insert bits eliminate the time wasted in going after a different set of steels whenever bit types are changed. Timken rock bits are interchangeable. Dozens of different bits fit the same drill steel. And it takes only a minute to unscrew one type of Timken rock bit and screw a different type bit on the same drill steel.

With Timken rock bits, your men can quickly switch to the most economical bit as the ground changes—right on the job. And because dozens of different Timken multi-use and carbide insert bits fit the same drill steel, you don't have to carry a large drill steel inventory.

Both Timken multi-use and carbide insert bits are made from electric furnace Timken fine alloy steel. And their special shoulder union keeps drilling impact from damaging the threads.

If you have a drilling problem, call our rock bit engineers. They'll be glad to help you. And there's no obligation. Just write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be used.

WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant-gauge holes, small diameter holes, very deep holes.

... your best bet for the best bit... for every job

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TRADE-MARK REG. U. S. PAT. OFF.

NOW! GREATEST ADVANCEMENT IN URANIUM DETECTION IN YEARS

Detectron DR-299 NUCLIOMETER*

NO OTHER INSTRUMENT LIKE IT FOR DEEP-HIDDEN ORE!

- ★ READS DIRECTLY IN PERCENT OF ORE—with Sample Holder Included
- ★ MUCH MORE SENSITIVE ON DEEP DEPOSITS THAN NEW INSTRUMENTS USING 1½" x 1" CRYSTAL
- ★ 4 TIME CONSTANTS
- ★ PROBE FOR USE AS GEIGER COUNTER
- ★ 6 OPERATING RANGES
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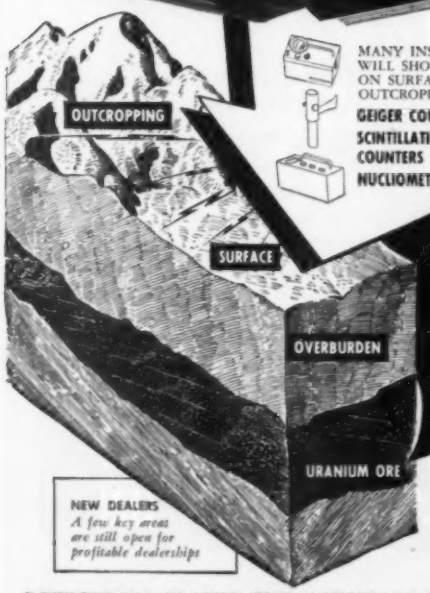
★ HANDSOME GRAIN LEATHER CARRYING CASE

ONLY YOUR DETECTRON DEALER
has this amazing new instrument . . .
SEE IT . . . TRY IT . . . BUY IT . . . TODAY!

Detectron has done it again . . . The new DR-299 is truly a tremendous step forward in uranium detection. Deep-hidden ore bodies impossible to detect with most instruments can now be uncovered. The sensational extra-sensitive DR-299 NUCLIOMETER is the most versatile radiation detection instrument made. Because of its amazing sensitivity, the DR-299 can also be used for Airborne and Grid Map Surveys and Assay estimation of specimens. In spite of the greatly increased sensitivity and new features incorporated into the new DR-299, our manufacturing volume makes it possible to sell at no increase in cost over the widely used DR-290.

*Trade Mark



MANY INSTRUMENTS WILL SHOW READINGS ON SURFACE OR OUTCROPPING . . .
GEIGER COUNTERS
SCINTILLATION COUNTERS
NUCLIOMETERS

But . . . the AMAZING NEW DR-299

will detect radiation from this deep-hidden ore body!

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A few key areas are still open for profitable dealerships

DETECTRON MAKES THE WORLD'S MOST COMPLETE LINE OF RADIATION DETECTION INSTRUMENTS

Drifts and Crosscuts

Uranium and Censorship

It is not unusual today to answer the telephone and find out that it is a call from New York City, Washington, D.C., or some other city far removed from the uranium mining districts, but possibly more vibrant with uranium speculation than even Salt Lake City, Moab, or Grand Junction. Very often the caller proves to be an investment specialist and not too uncommonly a speculator.

Questions follow the same general line. What uranium company has a good mine; what were the ore reserves at the Flat Out property when you visited it last month; how much money will Company Z Plus make per ton of ore milled? Other questioners ask frankly what uranium stock to buy.

At first we were a little surprised at these calls. It took only a few moments of reflection, however, to realize that uranium is a national catch word of growing importance. It, too, is apparent that while every newspaper and mass circulation magazine dealing with human interest stories has reported on who got rich and whose claims were jumped causing a revival of the gun slinging west, relatively very little accurate technical writing has described uranium deposits. Don't misinterpret the last statement; not for a minute because the United States Geological Survey, United States Atomic Energy Commission, and U.S. Bureau of Mines engineers and geologists have written many a book on uranium. However, such reports were initially on a restricted basis and at the very best enjoy only limited readership when declassified.

Thus it becomes apparent that MINING WORLD is being referred to in New York offices, and in other places, as the best qualified popular and readily available source of information on uranium.

A recent telephone questioner wanted some specific information on an important company. Frankly we told him that we were not in a position to answer that question and that he should contact the company itself. His reply was that one of the company officials told him to read about it in MINING WORLD. The questioner then went on to say that he could get all the information he wanted about some new penny stock for sale at an over-the-counter trading center, but he just couldn't get any accurate information about some of the larger uranium producing companies. Also, that an investor needed such information for appraisal as to investment possibilities. His point is well taken. However, the company is the one that releases or withholds information regarding its uranium activities. Several companies have, perhaps, hidden too deeply behind the curtain of secrecy which is always associated with anything atomic. At the same time other companies may have talked too loudly because of the enthusiasm the word "uranium" generates.

The official attitude of the United States Atomic Energy Commission in regard to mining operations shows an important enlightened and long range view as follows.

"The commission has not placed security restrictions on individual mine operators and thus they are privileged to disclose information regarding their ore production and reserves. This was necessary if we were to leave uranium mining to private industry. Security restrictions on information relating to ore reserves and production plans of individual operators would have made private financing virtually impossible."

Watch for 1954 Yearbook

The MINING WORLD editorial staff, with the able and invaluable assistance of key engineers, geologists, and metallurgists in all the important mineral production countries of the world, have been hard at work for several months on the big annual MINING WORLD Yearbook which will be mailed to all subscribers next month.

Many engineers so long used to the efficient collection of information here in the United States and who take for granted our excellent communications have little idea of the difficulties involved in finding out what the tin production of Japan, or platinum in South Africa was in 1954; that is, collecting these figures a few weeks after the end of 1954. This is written the last of January and there is some satisfaction to the Staff in noting that the 1953 Yearbook listed Japanese tin production as 858 metric tons. Final figures for 1953 were exactly that amount and for 1954 are 886. For platinum in South Africa we don't know now, but will guarantee you can find it in the forthcoming Yearbook.

The annual Directory of Mines section, while neither complete nor perfect, is the most inclusive printed and will again be an important part of the Yearbook. Special attention has been given to the uranium mining companies. Our records show that over 500 companies have been formed in the last year to explore for, develop, and mine uranium. Every day new companies are being formed for the same purpose. Recent trend has been away from new Utah companies with those in California, Texas, and Nevada the most active. The Mine Directory section will not list all these companies because many haven't started field operations. More than 100 have, and they will be listed where applicable under three main headings as to exploration, development, and mining.

The Catalog Section of equipment and manufacturers is being enlarged and expanded too.

This all adds up to the fact that the Yearbook will be more important for daily reference at your operation this year than ever before. The mining industry said that the last Yearbook was the best that it had ever seen. We feel that "you ain't seen nothin' yet."

The large capacity, long working range and easy maneuvering of the 480-W walking dragline help make it ideal for the profitable handling of big-yardage stripping. Built into this new model are the same advanced features that have earned for Bucyrus-Erie walkers a world-wide reputation for outstanding performance.

There's the exclusive Bucyrus-Erie walking mechanism for easy, accurate move-ups, and the balance of weight and loads that keeps the center of gravity well within best working limits. The large bearing area of the big circular base permits working close to banks and on soft ground in any weather. Main machinery is simple, with a minimum of moving parts, and is held firmly in alignment. Let us show you how the 480-W can give you big-yardage stripping at moderate cost.

Available with Ward Leonard Electric or Diesel Power and three combinations of bucket size and boom length 19L54

Boom Length	Bucket Capacity	Distance Material Can Be Moved*
215 ft.	8 yd.	431 ft.
195 ft.	10 yd.	395 ft.
175 ft.	12 yd.	359 ft.

*without throwing bucket. Digging depths range up to 141 ft.

Walking Draglines . . . SOUTH MILWAUKEE

BUCYRUS ERIE

. . . 4- to 30-cu. yd. capacity WISCONSIN

Capitol Concentrates

Here Is The Composite Commodity Reserve Plan Which Appears To Be Gaining Favor In Congress

Not too many people seem to have heard about the plan, called the Composite Commodity Reserve, endorsed to a considerable extent by the United Nations and proposed by Benjamin Graham.

Graham is no crack-pot economist. In fact, he is a director in seven major corporations, president of an investment company, and a member of the faculty of Columbia University.

You are apt to hear a lot about the Graham Composite Commodity Reserve Plan in the next few years as a number of members of the Congress are becoming increasingly interested in it. It is very possible that a bill may be introduced shortly to set up a joint House and Senate committee to hold hearings, study the plan, and evolve suitable legislation to put it into effect. The plan, whether you believe in international stockpiling and world currencies or not, cannot be ignored. It is not especially new. Graham wrote a very intelligent and readable book about it in 1944, entitled: "World Commodities and World Currencies." It is worth anyone's attention as background material for the present aspects of the plan.

According to a recent statement by Graham, the Composite Commodity Reserve Plan, as at present envisioned, can be outlined as follows:

A commodity unit, or "market basket," would be established. It would consist of a group of basic storable materials, in quantities that reflect their relative importance to world production and trade. A price level also would be established, around which the value of the composite unit would be stabilized. A $1,000 unit would consist of 20 major commodities, agricultural and industrial (mineral and wood products). Half of the quantities based upon world production, half on world trade. The stated quantities of all the components, taken together in a given base year, would have an average market value of $1,000.

An agency of the International Monetary Fund—such as an International Commodity Corporation—would stand ready to acquire, at 95 per cent of their base value, complete units whenever they are available. It would sell complete units whenever their combined quotations on the world markets rose above 105 per cent of the base. The units would be paid for by credits on the books of the Fund. These would add correspondingly to the "hard currency" resources of the Central Banks of the countries contributing unit components. (Private sellers would be paid just as they are now paid for other exports.) When the commodity units are sold out, the financial transactions would be reversed, and a corresponding reduction would be made both in the commodity assets and in the deposit liabilities of the Fund.

Suitable provision would be made for economical storage of the commodity units, the cost to be met out of the 10 per cent margin between the buying and selling points, and by other arrangements. Countries holding deposit credits with the Fund would have the privilege of retaining equivalent values in complete units, as agents of the corporation, or of taking over such units in exchange for their money claims. The composition of the unit would be changed from time to time, in accordance with an agreed-on technique, to reflect changes in the relative importance of the commodities.

Apparently the idea is that the units would be stored in the country of origin in most cases—and it is obvious that the U.S. would have the greatest number of units. Thus, in the case of war or any other emergency, we could quickly re-establish ownership by surrendering our money claims in exchange for the actual commodities—just as we now surrender dollars for gold. What this plan is supposed to guarantee, among other things, is that basic commodities (as a whole) will have a fixed value in terms of an international currency—a system that corresponds to the fixing of an international value for gold.

The idea of preventing major world price fluctuations particularly should appeal to metal miners. Perhaps the Graham plan is a step in the right direction.

• Strategic Materials Authority

Senator George Malone of Nevada has reintroduced his bill (S. 400) to set up a Strategic and Critical Materials Authority. His measure proposes to put into the hands of a cabinet-level body all the President's powers under the foreign trade agreements as far as they relate to such materials.

The authority would have the right to invoke the various escape clauses, reservations, and options of the foreign trade agreements; could impose duties and import quotas where it found that the landed duty-paid price of the foreign article in the principal market or markets in the United States is not a fair price, including a reasonable profit to the importers and is substantially below the price, including a reasonable profit for domestic producers, at which the like or similar domestic article can be offered to consumers of the same class by the domestic industry in the principal market or markets in the United States.

The bill was assigned to the Senate Interior Committee, but actually it is not within the jurisdiction of that committee since it deals fundamentally with revenue matters even though those matters concern strategic materials. Senator Malone must be aware of this. Furthermore, an authority composed of cabinet members would be directly under the thumb of the White House and could not be expected to act contrary to the Administration's tariff policies were the bill to become law. However, the bill stands no chance of passing anyway.

• This Bill May Pass

Representative Clair Engle of California has reintroduced H. R. 100, his bill to permit the mining, development and utilization of the mineral resources of all public lands withdrawn or reserved for power development. This bill was very nearly en-

acted by the 83d Congress and probably will pass the 84th.

• Manganese Definition Extended To Other Depots

The change in the GSA regulation which added 1,200,000 units of manganese to the Wenden (Arizona) purchase depot's quota has been extended to the depots at Butte-Philipsburg, Montana, and Deming, New Mexico, thus extending the potential life of those depots as well. The definition "recoverable" instead of "contained" manganese now applies to the three purchase depots.

• Engle Reintroduced Gold Bill

Representative Clair Engle of California has reintroduced, as H. R. 661, 84th Congress, his bill to permit the free movement and sale of newly mined gold within the United States, its territories and possessions, including Alaska. The bill, which has several new variations, now covers melting, smelting and concentrating. It also freezes the gold held by the United States for monetary purposes only and prohibits its sale for commercial purposes.

The bill looks like a good one, but the addition of the freeze clause may make it harder to get through the Congress than the Bartlett bill, H. R. 606, which is the same as the Engle gold bill of the 83d and previous Congresses.

A hearing was held by the Senate Banking and Currency Committee on a group of these gold bills last year, but no reports were issued and nothing was done. Since the abolition of the old House Committee on Coinage, Weights and Measures, it appears nearly impossible to get hearings on such bills on the House side of the Congress because the reports of the Treasury Department always state that the Bureau of the Budget considers them not in line with the President's policy.

• Lead-Zinc Production Down

Now that the preliminary production statistics are available, we learn how badly the domestic lead-zinc industry fared during 1954.

Lead and zinc production from domestic mines during 1954 was the lowest since the bottom of the big depression in 1934. U.S. lead output last year totaled only 315,000 tons. That's 115,000 below the recent peak of 430,000 tons in 1950 and 80,000 tons below the 1943-1947 average. Zinc production in 1954 was 464,000 tons as compared with 681,000 tons in 1951 and a 1943-1947 average of 657,000 tons.

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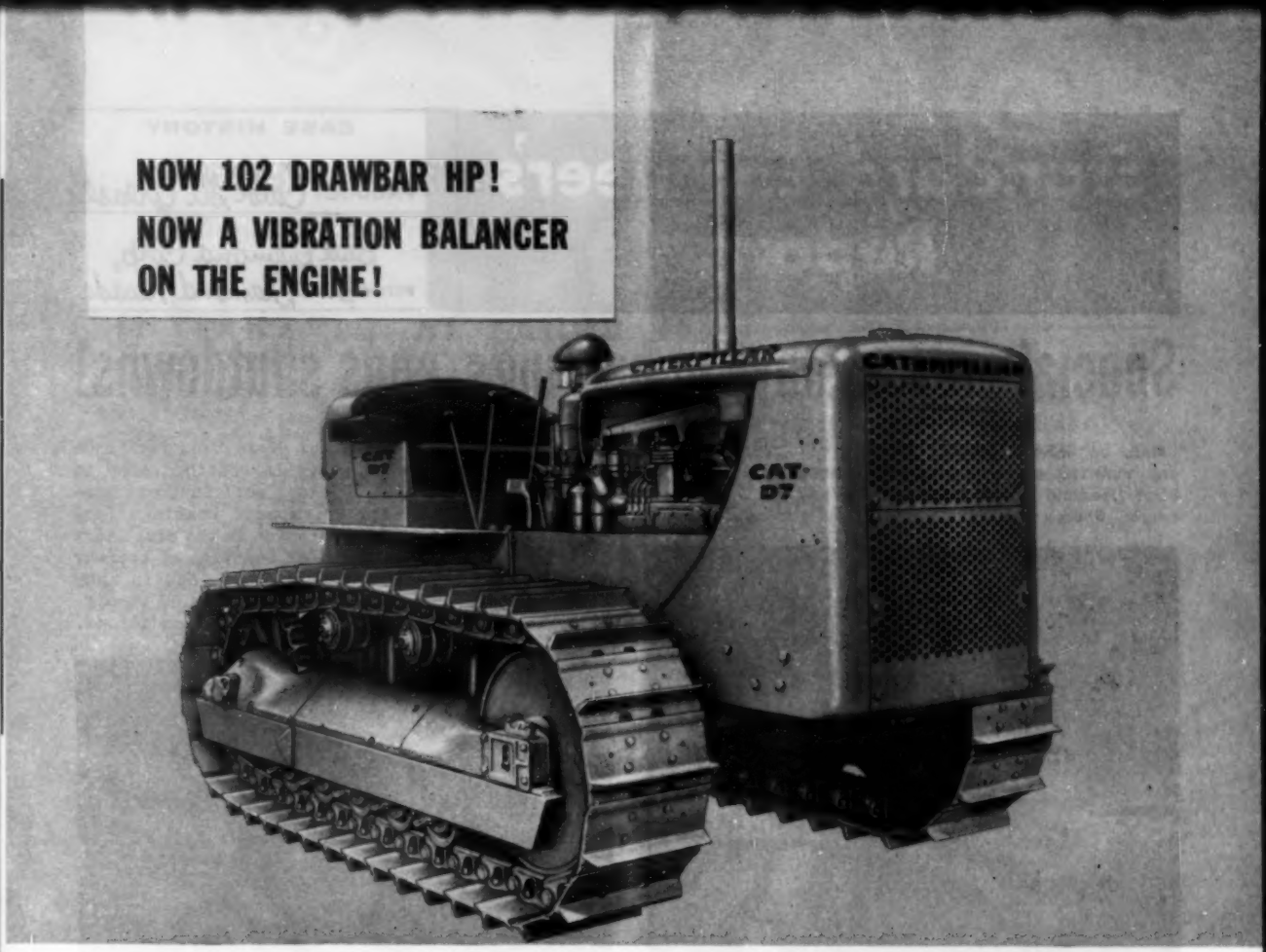
MORE POWER, SMOOTHER PERFORMANCE

NOW 102 DRAWBAR HP!
NOW A VIBRATION BALANCER ON THE ENGINE!



Here's the new CAT® Diesel D7 Tractor . . . latest example of Caterpillar Leadership in Action!

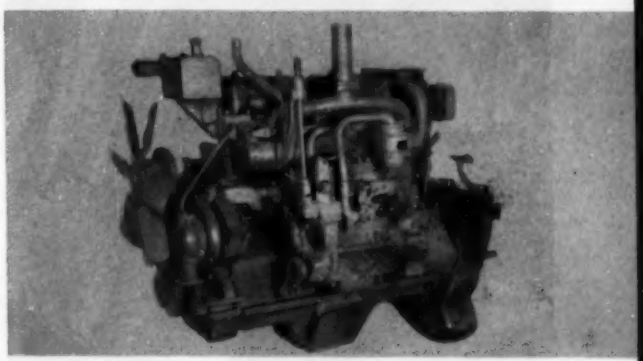
DRAWBAR HP INCREASED to 102, engine HP to 128 (at 1200 r.p.m.).

VIBRATION BALANCER on the powerful 4-cylinder engine now gives you all the smoothness of 6-cylinder performance.

DRAWBAR PULL now 28,700 pounds maximum.

NEW STARTING ENGINE has more power for surer, faster starts in all weather, and simple single-lever control for easier operation.

NEW "WATER QUENCH" PROCESS for hardening track shoes almost doubles shoe life.



New 128-HP Engine features improved fuel injection system, flanged center main bearing to take crankshaft thrust, many other advances.

The new D7 Series C is ready now to give you more profitable production than ever before. Call your Caterpillar Dealer today for a demonstration!

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I would like additional information on the new D7 Series C

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Standard Engineer's Report

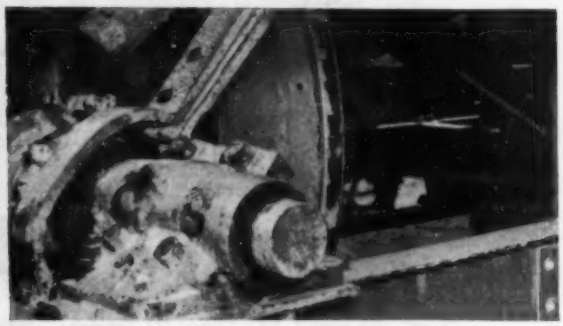
CASE HISTORY

PRODUCT Calol SA Grease

FIRM Blue Diamond Corp, Blue Diamond, Nevada

Special grease stays in bearings, ends shutdowns!

CALOL SA GREASE SOLVED PROBLEM of grease melting and running onto clutch of tramway drive unit at Blue Diamond Corp. gypsum mine and mill near Las Vegas. When grease previously used got onto clutch, all operations had to be shut down. Used for three years, Calol SA Grease stays in bearings even in 110°F. summer weather. It stays soft in their sub-zero winters," protects drive unit bearings from heavy abrasive dust always present in the air. Calol SA Grease is also used in wheel bearings of tramway cars, which carry 1800-pound loads, and in many plain and anti-friction bearings in the mill itself. It comes in several grades to meet all conditions.



FREE CATALOG: "How to Save Money on Equipment Operation" will be sent on request to Standard Oil Co. of Calif., 225 Bush St., San Francisco.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

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How to reduce wear in all types grease-lubricated machine bearings

Specialized Calol SA Grease will provide constant lubrication in high ambient and bearing temperatures—proved in mill ambient temperatures of 250°F. and Navy Ball Bearing Machine tests of 10,000 rpm and extreme temperatures.

A. Made from sodium-aluminum base...very high melting point minimizes seepage.

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

March 1955

INTERNATIONAL PANORAMA

WASHINGTON, D. C.—The United States government plans to spend $783,000,000 for stockpiling of strategic and critical materials in the fiscal year starting July 1, 1955. Purchases will largely be minerals.

ANCHORAGE, ALASKA—Alaska's largest mercury mine has been sold by DeCoursey Mountain Mining Company to the Canadian firm—Brewis Red Lake Mines, Ltd.

DJAKARTA, INDONESIA—Tin production in 1954 set a post-war record of 35,627 tons.

TORONTO, ONTARIO—The mining boom in Ontario in 1954 resulted in an all-time claim staking rush with prospectors staking 50,230 claims. The previous high—29,019 claims were staked in 1953.

CANBERRA, AUSTRALIA—Large and small gold producers are now applying for aid under the Gold Mining Industry Assistance Act. Maximum benefit for small producers is $3.36 per ounce; and $4.48 for large producers.

WHITE PINE, MICHIGAN—White Pine Copper Company poured its first blister copper in mid January to become the nation's newest copper producer. This new mine, flotation plant, and smelter has an annual capacity of 37,500 tons of copper.

SAN FRANCISCO, CALIFORNIA—Aluminum production in the United States in 1954 was at an all-time record high at 1,460,587 short tons, an increase of 200,000 over 1953.

MOAB, UTAH—Success of the mining industry in finding and producing greater amounts of uranium is reflected in President Eisenhower's budget recommendation to Congress. Operating costs of AEC will rise, chiefly because of high level of procurement of uranium ores and concentrates.

ALPINE, TEXAS—Universal Service Corporation has started a uranium exploration program in the Lajitas district of southern Brewster County. Diamond drilling and surface trenching are planned.

HOBBS, NEW MEXICO—Freeport Sulphur Company and Pittsburgh Consolidated Coal Company are jointly financing a new Lea County potash mine, and refinery. Sinking of two 1,700-foot deep shafts is the first step to bring a new mine into production.

MT. ISA, AUSTRALIA—The first diamond drill hole at the Mary Kathleen lease of Australian Oil Exploration Ltd. showed a combined width of 240 feet of pitchblende mineralization. The first 150 feet assayed 0.33 percent U_3O_8.

CONCEPCION del ORO, MEXICO—The Cia Minera Julieta, S. A. has started mercury production at its El Tanque mine. Ore assaying up to 1.5 percent mercury is treated in a 10 retort plant.

EL PASO, TEXAS—Rare Metals Corporation of America has acquired all of the capital stock of Arrowhead Uranium Company and its properties in the vicinity of Cameron, Arizona. Drilling and exploration work are under way, and an application for erection of a mill has been filed with the AEC.

WALLACE, IDAHO—Vulcan Silver-Lead Corporation has acquired interests in a South Carolina deposit of heavy minerals, including titanium-bearing ores and zircon, and in a Colorado uranium prospect.

NEW YORK, NEW YORK—In a move to diversify and expand its operations, Pacific Tin Consolidated Corporation will purchase several companies that mine, process, and sell feldspar in North Carolina, Georgia, and Tennessee.

BUENOS AIRES, ARGENTINA—Established foreign mining concerns will benefit by a new law which permits "old capital" to export eight percent of its original investment annually, and to repatriate the original investment by installments after 20 years of production.

IDRIA, CALIFORNIA—New Idria Mining and Chemical Company has acquired the Strawberry tungsten mine near Yosemite National Park for $1,075,000. The mine will be operated as a division of New Idria.

ACCRA, GOLD COAST—Industrial Diamonds of South Africa has asquired diamond mining rights covering 80 square miles in the Ashanti district. The concession extends until the year 2000.

$15,000,000 Potash Operation Gets Under Way

A new $15,000,000 potash operation in Lea County, New Mexico is being undertaken jointly by Freeport Sulphur Company and Pittsburgh Consolidation Coal Company. Drilling has already started for two 1,700-foot shafts, and plans for a refinery and other buildings are in preparation. Two and one-half years of construction work will be needed to complete the operation.

Meanwhile, in behalf of Freeport Sulphur, the State Land Office has asked the United States Bureau of Land Management to convey to New Mexico 360 acres of land in Lea County as "lieu" property given the state in lieu of state lands condemned for federal uses. Freeport presently leases the property (where the potash project is being undertaken), and wants to own the land outright. Legally, it cannot be purchased from the federal government but it could be purchased on bid from the state. Freeport is reported to have spent $200,000 in core drilling operations in Lea County during the past two years, and has potash leases on 1,941 acres in Lea and Eddy County.

O'okiep Starts World's First Copper HMS Plant

The world's first HMS plant designed and built expressly for upgrading of copper ore has been placed in operation by O'okiep Copper Company, Ltd. The new plant has a capacity of 75 tons per hour and treats ore from the firm's Nababeep mine at Nababeep, Cape Province, Union of South Africa.

The new plant was built to treat ore from a large low-grade section of the mine which contains inclusions of barren gneiss in the copper-bearing norite. Specific gravity of this norite is 3.53. The gneiss with a gravity of 2.68 will be eliminated as the float tailing product. Separation gravity is about 2.75. Feed to the plant is minus-6-inches, plus-¼-inch. Approximately 45 tons per hour of sink concentrate are recovered with 30 tons of float tailing being discarded. The new plant incorporates an 8-by 8-foot Wemco drum separator revolving at 1.4 revolutions per minute.

This plant will also upgrade ore from the south section of the mine which has caved from the walls of the huge open pit bringing with it sections of the over lying waste.

In addition to the new HMS plant, O'okiep is operating two 1,900 ton per-day copper flotation mills, one 500-ton oxide copper leaching plant, and a 200-ton tungsten gravity concentration mill.

J. M. MacLeod is general manager; J. H. Vose, Jr., assistant manager; and F. J. Martin is superintendent of mills for the company.

OVERHAND STOPE DRILLING with a two-jib jumbo. Holes, spaced on 5-foot centers are drilled 10-feet into the roof at an angle of 60°.

DRIFT ROUND being drilled with one of the track mounted jumbos in undercutting the ore body. Flood lights are used to light up the working faces making for a much more efficient operation.

How Tri-State Zinc Continues To

Tri-State Zinc, Inc., located in the Upper Mississippi Valley zinc-lead district has long been a pioneer in the mining field. It was one of the first companies to experiment with and prove that Diesel loading and haulage equipment could be used underground. Following this, Tri-State Zinc was one of the first to use mechanized off-track mining equipment, and also one of the first to realize the advantages of developing a shallow flat lying ore body by an inclined adit in place of a vertical shaft. In addition to this the company has developed a mining method to fit its own ore body.

What does all of this mean? Just one thing—less cost per ton of ore mined!

This is not all. Tri-State Zinc's milling costs are also one of the lowest for any zinc-lead sulphide mill. Tri-State Zinc has continued to meet the low market price by steadily decreasing its mining and milling costs.

Double Pitch Ore Body

Tri-State Zinc's Bautsch mine is located near the southern perimeter of the Upper Mississippi Valley zinc-lead district 5½ miles southeast of Galena, Illinois. This district, embracing the corners of three states—Wisconsin, Illinois, and Iowa—covers approximately 2,500 square miles. It is one of the oldest mining areas in the United States. Mining of shallow lead deposits began by early settlers in 1788.

The Bautsch ore body was discovered in 1943 by a joint United States Geological Survey and U. S. Bureau of Mines drilling program. Later the property was acquired by Tri-State Zinc. The ore body occurs in a synclinal trough and is of the double pitch type, local geological name given to two inclined reverse faults. The zinc-lead mineralization occurs in formations of dolomites and limestones of Middle Ordovician age (see accompanying geological chart). Ore occurs from a few feet in the Trenton formation up into the Buff, but not consistently for the entire ore body. The ore-bearing minerals are the sulphides, sphalerite and galena. These occur disseminated in the Oil rock formation and as a stockwork in the other formations.

This story on Tri-State Zinc's mining operation near Galena, Illinois is the first of two parts. The April 1955 issue of MINING WORLD will describe milling operations.

Average width of the ore body is 200 feet, average height is 65 feet with a maximum height of 125 feet; the length has not yet been determined, but is more than several thousand feet.

Initial Mining

The Bautsch ore body is located several thousand feet from Tri-State Zinc's gravity-flotation mill constructed at the site of another ore body (the Gray mine). Initial mining from the Bautsch was started by Tri-State Zinc in 1946 and was conducted through two vertical shafts, using a room and pillar method, and employing off-track equipment. Trucks hauled the ore from the underground working faces to one of the shafts where it was hoisted and dumped into a storage bin on the surface. Here it was again loaded into trucks and hauled to the mill. This re-handling of the ore three different times before it reached the mill, plus difficulty encountered with the wet mine ore freezing in the headframe bin during the winter months, forced a change.

The first idea was to move the mill to the shaft site. However, this was determined not to be feasible because of the location of other ore bodies to

LOADING ORE from a stope with a ¾-cubic-yard Koehring electric shovel. About 35 percent of the ore is removed during stoping operations; the remainder being left until the stope is completed.

CORE DRILLING to help determine the horizontal limits of the ore body. The drill is mounted on a jib of one of the self-propelled jumbos.

Operate With Low Metal Prices

be mined at a later date. The next thought was to sink an inclined adit to the ore body, so that trucks could haul directly from the working face to the mill.

Advantages of an Adit

In addition to eliminating the rehandling of the ore and the trouble caused by it freezing during severe winter weather, the adit would have many other advantages. Some of the most important of these are:

1. Less secondary blasting. The size of the rock would be limited only by the size of the loader and the primary crusher. Using a hoisting system it was governed by gates, chutes, and the skips.
2. Ease of transporting equipment and supplies underground. All equipment could be taken underground in one piece through an adit. It was necessary to disassemble all the large equipment (shovels, tractor, and trucks) in order to lower them through the vertical shaft.
3. Equipment could be brought to the surface for periodic servicing and maintenance without interfering with the normal mining operation. Bringing the equipment to the surface through the shaft was not practical, except for a major overhaul.
4. Less difficult to increase the tonnage mined as compared to increasing the capacity of the hoisting system.
5. Elimination of a shut-down due to the hoisting system being out of order. Using an adit it would take a simultaneous break-down of all the loading and haulage equipment to have the same effect as not being able to hoist.
6. Danger of men being trapped in the mine because of a power failure or shaft fire would be eliminated.

Decision to Drive Adit

With these advantages known, it was decided to drive an inclined adit to the ore body. The terrain between the mill and the ore body made it possible to locate the portal of the adit 170 feet above the mine floor, and 2,500 feet from the mill. It was determined that the steepest grade at which Diesel haulage trucks would perform satisfactorily was 10 percent. Therefore it was decided to drive the adit on this grade. Driving of the 12-foot-high, 17-foot-wide, and 1,700-foot-long adit was finished in June 1949. All of the equipment was selected so that it could later be used in the mining operation.

Mining and Milling Costs, Tri-State Zinc, Inc., Galena, Illinois

Operation	*Costs in cents per ton*
Drilling	30.0
Blasting	17.5
Loading, Eimco and shovel	10.8
Haulage	17.7
Pumping	7.0
Other mining costs	21.0
Total mining cost	104.0
Total milling cost	78.5
Total mining and milling cost	182.5

Clay Bed Gives Trouble

Mining of the Bautsch ore body is being done from roughly five feet above the Clay bed to the height of the ore body. This average thickness of five feet of the Oil rock formation is left to provide a smooth hard surface on which the off-track mining equipment can operate. If all of the Oil rock formation were mined, the equipment would become mired in the wet sticky clay. Ore also occurs below the Clay bed in the Glass rock and the top few feet of the Trenton. This will be mined when the other ore-bearing formations are depleted. Changes will be made in

TRI-STATE ZINC'S ENGINEERS who developed the present system of mining and keep those costs low: left, V. C. Allen, manager; center, John Thieler, engineer; right, Joe Nolan, mine superintendent. Not pictured, but who deserve credit for Tri-State's mining achievements, are M. H. Loveman, former manager (retired); and Paul Herbert, geologist.

the mill flow sheet for handling the sticky clay.

Old Mining Method

As mentioned previously, initial mining of the Bautsch was by the room and pillar method, using a modified breast stoping system. With this method, a series of benches (the number depending on the thickness of the ore) were advanced for the full height of the ore body. The benches were advanced in steps, with the top bench preceding the second, and the second preceding the bottom. The distance that the benches led each other was about 12 feet, the length that the horizontal blast holes were drilled.

With this method the mining cycle is as follows: First, the bottom bench is drilled with a two-jib jumbo mounted on crawler-type tracks. This bench is shot and the broken ore smoothed off with a bulldozer. The drill jumbo then climbs up on the muck pile and drills the second bench. This is blasted and the broken ore again smoothed off. The jumbo again ascends the muck pile and drills the top bench. The top bench is shot and the entire muck pile loaded with a ¾-cubic-yard electric shovel into 6-cubic-yard Koehring Dumptors for haulage to the mill. When the muck pile has been removed, the above cycle is repeated.

16-Foot Undercut

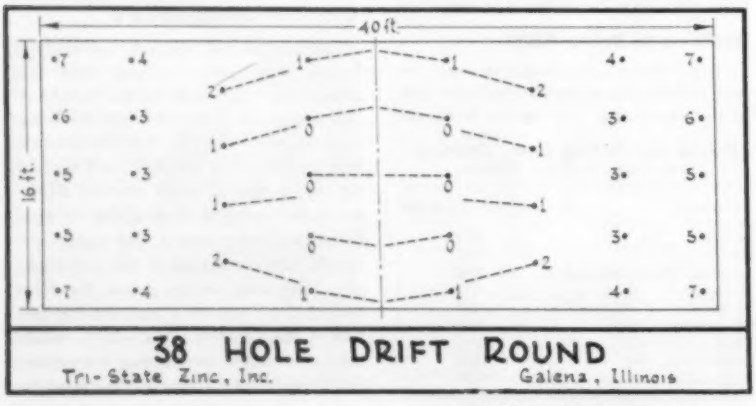
This modified breast stoping system was later changed to a modified shrinkage stoping method which Tri-State Zinc engineers designed to fit the ore body. Using this method the ore body is first undercut by low-head breast stope mining with drifts 40 feet wide and 16 feet high (see sketch No. 1). These drifts are usually driven on 80-foot centers leaving a 40-foot square pillar. Size of the pillars are altered where necessary, depending on the type of ground.

Drilling is done with one of four two-jib jumbos mounting either 3-inch or 3½-inch drills. One is mounted on crawler-type tracks and is driven by a compressed air motor; the other three are mounted on HD-5 Allis-Chalmers tractors. Drill steel used is 1¼ inch, using four point Ingersoll-Rand detachable bits. Bits are sharpened once. Average footage drilled per bit is 100 feet. The round drilled is a 38-hole V-cut (see accompanying sketch).

Two men operate a jumbo. Adjustable flood lights mounted on a tripod light up the working face helping to make for a more efficient operation.

Holes are loaded with 1⅛-inch sticks of Atlas Gelodine No. 1 powder of 60 percent strength. Powder is taken from a magazine on the surface to a central point underground each day. From this point it is loaded into the bucket of an HD-5 Allis-Chalmers tractor and hauled to the drilled face. Top holes of the undercut are loaded from the bucket of the tractor. One man stands in the bucket, while the other operates the tractor; the two men alternate in their work. Holes are detonated electrically using regular delay blasting caps with a sequence of firing as shown on the drawing of the drill round.

When the undercut has been completed stoping operations begin. Starting at the end of the undercut nearest the adit, holes 10 feet deep are drilled into the roof on an angle of 60° from the horizontal (see sketch No. 2). Drilling is done with the jumbos previously described. Holes are drilled in straight rows spaced five feet apart in each direction. The stope round is also fired with regular delay caps using zero delay on the first row, number one on the second row, etc. Powder consumption is 0.50 pounds per ton.



Cat Bulldozer Important

When the stope round has been blasted and the roof barred down, a D-7 Caterpillar tractor bulldozer builds a rough road to the top of the muck pile. The bulldozer levels off the pile, pushing the ore towards the front of the stope, so that there is a distance of approximately 20 feet between the broken ore and the roof. The muck pile is graded toward the rear of the stope so that the drill jumbo can easily

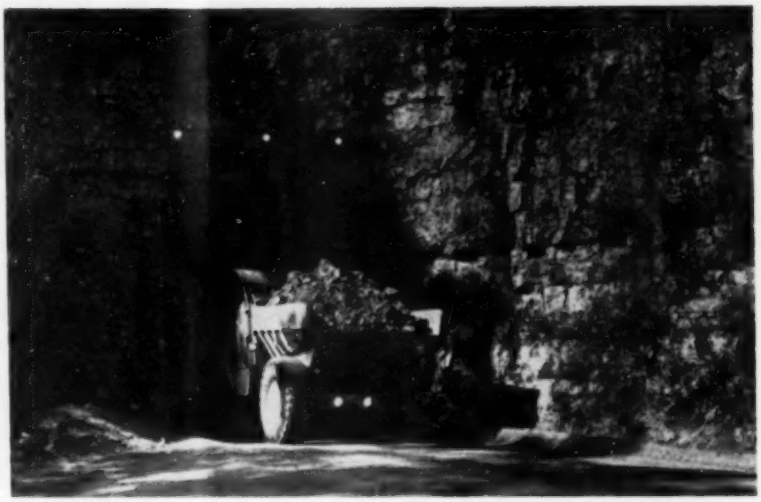
ascend to the top of the pile (see sketch No. 3). After the bulldozer levels the muck pile it is used to clean-up the fly rock around the pile.

Excess broken ore is loaded from the front of the stope into 6-cubic-yard Dumptor trucks with a ¾-cubic-yard electric shovel. Three electric shovels of ¾-cubic-yard capacity are at use in the mine. Two of these are Koehring's and the other is a Bay City. These shovels require a width of 25 feet and a height of 14 feet in which to operate. Approximately 35 percent of the broken ore is removed, the remainder being left in the stope until it is completed. The drilling, blasting, bulldozing, and loading cycle is repeated as described previously, until mining reaches the top limits of the ore body (see sketch No. 4).

Development drifts are only frequently needed. Most of these are 14- by 17-feet in cross section and are driven as access drifts running to outlying ore bearing areas separated from the main ore body. This size of a drift is also sometimes advanced into certain sections of the ore body for the purpose of opening up new stopes. Broken ore in the development drifts are loaded into the Dumptors with a 104 Eimco Rocker Shovel.

Traffic Lights in Adit

All of the mine ore is hauled to the mill by three 6-cubic-yard. Diesel-powered Koehring Dumptors, with a fourth and fifth held as spares. As the loaded truck enters the adit, the driver, without stopping the truck, reaches out and pulls a cord connected to a switch. This makes an electrical contact lighting a stop light at a halfway point in the adit. If an empty truck is coming down the adit it will then stop at this light. At this point the adit has been widened to allow the trucks to pass. On reaching this passing area the driver of the loaded truck pulls another cord which turns off the traffic light at the center of the adit and lights a stop light at the portal warning trucks not to enter. On reaching the portal he again pulls a cord turning this light off. Empty trucks coming down the adit also pull similar cords lighting a stop light at the halfway point and later this is again repeated at the center to light a stop light at the foot of the adit.



KOEHRING DUMPTOR, six-cubic yard, emerging from the inclined adit with a load of ore. The Dumptors provide a fast economical method of transporting the ore from underground working faces to the mill, a distance of approximately 1.1 miles.

1.1 Mile Haul

The average distance from the present working faces to the mill is 1.1 miles, 2,700 feet of which is on a grade of 10 percent. Before dumping the truck load of ore into the primary crusher at the mill, each driver stops and weighs his load on a platform balance. The truck driver reads the scale and records the weight without moving from his driver's seat. Each truck averages slightly over 10-dry tons per load and roughly 16 trips per shift.

No time is lost in hauling by turning the trucks around. Dumptors are driven with the load of ore in front while traveling to the mill and with the empty box in the rear when returning to the mine.

Change in Mining Plans

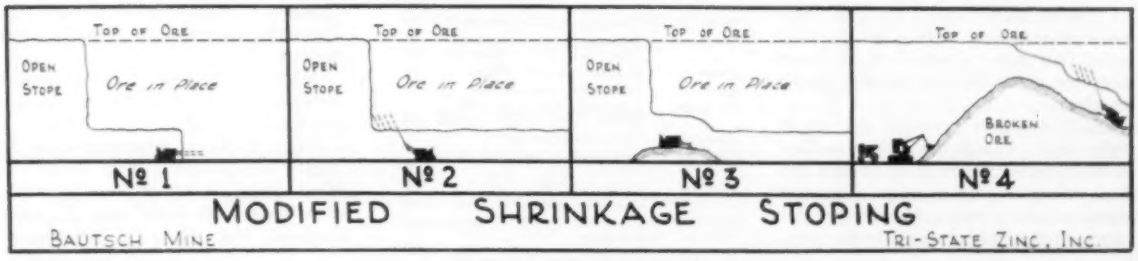
After an area in the north half of the ore body had been undercut it was found that the ore was too soft to provide a strong enough back for using the present stoping method. A crosscut has been driven from the center of the adit to this area, and a drift similar to the undercut, except that is along the top of the ore body, is now being driven. The roof of this drift is in barren ground and is strong enough to permit safe working conditions. The exact method of mining this area has not been determined. However, it is planned to drill down holes rather than to use a method of breast stoping.

Drill and Blast—One Shift

Mining is on a two-shift basis. All drilling and blasting is done on the day shift with loading and hauling on both shifts. In addition to the mine superintendent and two foremen, 22 men are employed in the mine. Four men are used for loading and haulage on each shift. One shovel operator loads two trucks. A third man drives and loads his own truck. Other men employed on the day shift are eight drill operators, two powder men, one trimmer, one bulldozer operator, one utility man, and one compressor man.

Plenty of Fresh Air

On the first Diesel equipment used underground by Tri-State Zinc, a cylinder of oxygen was mounted on each machine, discharging into the exhaust



CATERPILLAR D-8 TRACTOR leveling off the muck pile in one of the stopes after blasting. The D-8 is also used to clean up fly dirt and keep mine roads in first class shape.

DUMPTOR OPERATOR at the halfway point of the 1,700-foot adit reaches out to pull a switch which lights a traffic light at the portal, warning other Dumptors not to enter.

stream. Numerous tests of the mine air proved that this was not necessary; hence, it is no longer followed. Frequent tests of the mine air by Tri-State Zinc and periodic tests by the insurance company and the Illinois State Mines Department have failed to locate a concentration of carbon monoxide or oxides of nitrogen that even comes close to approaching the maximum allowable limits. To-date the carbon monoxide content in the adit has never exceeded 10 parts per million; the maximum allowable limit is 100 parts per million of carbon monoxide and 25 parts per million of oxides of nitrogen. Frequent tests are taken of the air in dead-end drifts. Small booster fans or blowers mounted on exploration churn drill holes are used to supply air to these drifts.

Fresh air (downcast) is supplied through one of the shafts and several churn drill holes using the inclined adit as the upcast. The amount of fresh air being supplied is approximately 32,000 cubic feet per minute. 24,000 of which is carried through the shaft. Using the adit as the upcast prevents the exhaust fumes discharged into it from entering the mine proper. The Dumptor's motor is shut off while loading, keeping exhaust gases discharged into the mine at a minimum.

Mining shifts are from 7:00 a.m. to 3:30 p.m. and 7:00 p.m. to 3:30 a.m. This gives a period of 3½ hours between shifts for the powder smoke to clear.

Each truck is serviced and carefully checked each day at the surface shop to avoid unnecessary smoke and foul odors. Trucks average a general overhaul once every two years. All other equipment receives similar periodic service underground. An exhaust scrubber is mounted on the Eimco loader as an added protection.

Underground Exploration

Diamond core drilling is done underground to determine the toe of the ore body, making sure that no ore is left in the walls. Size of holes are "EX" ($1\frac{7}{16}$ inch)and are drilled horizontal or nearly horizontal. No set pattern of drilling is maintained, holes are put in where needed. The drill is mounted on a jib of a self-propelled drill jumbo. This provides a very maneuverable and easy method of drilling. Men for operating the drill are taken from the blast hole drilling crew during periods when they are not needed at their regular jobs.

Good Working Conditions

Men are transported to the mine from a surface change house by a Diesel truck equipped with benches. During the winter months a removable top is placed over the truck body, so that the men do not become exposed to the severe weather on returning to the surface in their wet mining clothes.

Ore Bearing Formations, Bautsch Mine, Tri-State Zinc, Inc. Galena, Illinois

*Formation**	*Lithology*	*Average thickness in feet*
Buff	Dolomite, yellowish-buff	120
Drab	Dolomite, buff to brown, with bands of chert nodules	105
Gray	Dolomite, grayish-brown	14
Blue	Limestone, grayish-blue	6
Oil Rock	Limestone, brown to light brown	16
Clay Bed	Shale, bluish-green	7
Glass Rock	Limestone, brown to dark brown	8
Trenton	Limestone, gray	31
	Dolomite, brown	24

* Miners' terminology

Air, Power, Water

Compressed air is supplied with an 800-cubic-foot-per-minute compressor located on the surface. Air from the compressor is taken underground through one of the shafts. A portable 360-cubic-foot compressor is tied into the air line at the northern end of the ore body because of the transmission loss. As mining continues in a northern direction, all of the compressed air will probably be supplied with portable compressors.

Power is taken underground through a churn drill hole at 440 volts. The electric shovels operate on this voltage.

Mine water drains to a central sump where it is pumped up through the shaft to the surface and waste. This is accomplished with a 6-inch centrifugal pump operating under a head of 275 feet. Average amount of water pumped is 950 gallons per minute.

Tri-State Zinc, Inc's. operations have previously been described by V. C. Allen in the technical press. Interested readers are directed to, and acknowledgment is made to, the following:

Allen, V. C., *Diesel Truck Haulage Through Inclined Adit*, Mining Engineering, June 1951.

Allen, V. C., *Use of Diesel Equipment in a Zinc-Lead Mine*, Mining Congress Journal, January 1953.

Allen, V. C., *Mechanization at an Upper Mississippi Valley Zinc-Lead Mine*, Transactions of the Institution of Mining and Metallurgy, London, England, Vol. 62, 1952/53, Part 6.

TWO CYCLONES, 15-inch diameter, constructed from Ni-Hard cast sections. Cyclones operate at between 20 to 30 psi.

Cyclone Plant Improvements Up Recovery of Mesabi Iron Ore

By R. A. DERBY

Changes are rapidly taking place in the use of cyclones on the Mesabi Range for concentrating the finer mesh fractions of iron ore, usually considered to be the minus-¼-inch, plus-65-mesh material. In illustrating these changes, the flowsheet of the cyclone section of the Hill-Trumbull plant at Calumet, Minnesota, near the the western end of the Mesabi Range, will be described. The Hill-Trumbull plant, which consists of a washing, heavy media and cyclone section, is owned by The Mesaba-Cliffs Mining Company, and operated by The Cleveland-Cliffs Iron Company.

Some of the more important trends in cyclone plant flowsheets for treating these finer fractions are:

1. Use of more cyclones than previously were thought sufficient to handle the required tonnage of feed.
2. Increasing the media-to-ore ratio.
3. Use of more magnetic separator capacity for media cleaning and recovery through more and larger separators.
4. Washing of both the concentrate and tailing-drain-screen oversize material, permitting bypassing of these products to the secondary magnetic separators to promote a cleaner magnetic concentrate from the primary magnetic separators.
5. Use of gravity flow and elimination of pumps wherever possible in handling material throughout the plant.

85 Long Tons per Hour

Feed to the cyclone plant is the minus-¼-inch, plus-65-mesh material from the washing plant. The average feed rate to the plant during the 1954 operating season was 85 long tons per hour on a dry basis; it contained 48.29 percent iron and 26.82 percent silica.

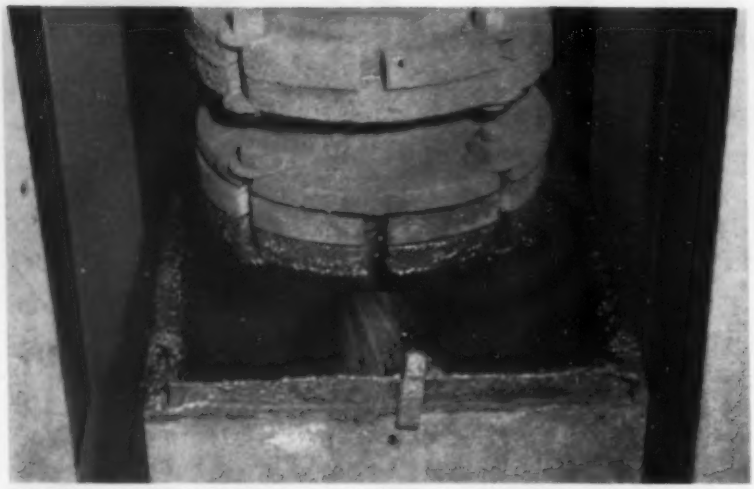
The washing plant classifier sands, which comprise the cyclone feed, are delivered to the plant via a 24-inch belt conveyer to two 6- by 20-foot dewatering screens. The undersize from these screens, which is minus-¼-millimeter (60 mesh), goes to tailing.

The dewatering screen oversize drops into two, 100-ton surge bins. Roll feeders with adjustable gates deliver this material to two 8-inch pumps, one feeding each cyclone circuit, which are almost identical. Only one circuit will be described in detail with the exception of the points at which they vary.

Media—Taconite Concentrate

Recirculated media is also fed to the 8-inch pump, where mixing of the cyclone feed and media occurs. Most of the media used is a magnetic concentrate from the Erie Mining Company's pilot taconite plant at Aurora, Minnesota. It has a dry specific gravity of 4.53 and for the season averaged 74 percent minus-325-mesh. Because of this extremely fine mesh, it has been found advantageous to blend in a courser grind magnetite in order to maintain the desired media

Mr. Derby is Operating Metallurgist for The Cleveland-Cliffs Iron Company, Taconite, Minnesota



CYCLONE DISCHARGE should be in the form of an inverted "cone" as shown in the above picture. A thick "roping" discharge indicates the cyclone is being overfed or that the separating gravity is not high enough.

gravity in the circuit. This material has been obtained from the National Lead Company at Tahawus, New York.

Each 8-inch pump delivers the ore and media to two 15-inch-diameter cyclones at a feed pressure of between 20 and 30 pounds per square inch. The cyclones for most of the season used a 4-inch vortex with 2¾-inch apex; they are constructed from Ni-Hard cast sections. Average gravity of the media entering the cones was 2.26, with normal operating ranges varying between 2.20 and 2.30.

Underflow from both cyclones is discharged onto a 5- by 10-foot drain screen. The drain screen undersize, minus-28-mesh, is returned to the circulating media system by an 8- by 6-inch pump. The oversize flows to a primary 36- by 36-inch magnetic separator. The sands and overflow from this primary become feed to a secondary machine of the same size; the sands from this unit in turn flow to a 72-inch spiral dewatering classifier, from whence they are transported to the concentrate loading pocket via a 24-inch conveyor. The classifier overflow is pumped away as tailing.

Magnetics from both the primary and secondary separators in the sink (concentrate) circuit are pumped by a 4-inch pump to a 5- by 8-foot sink tramp screen equipped with sprays for washing the non-magnetic tramp material in the media. The function of this screen is to separate the non-magnetics from the media in which they become mechanically entrapped. The principal disadvantages of this tramp material are that it increases the viscosity of the media, making it difficult to pump, and also acts to reduce the specific gravity which hinders the separation in the cyclone. Undersize from this screen goes to a 30-foot thickener; the oversize is sent to the concentrate dewatering classifier.

Cyclone Wear
1954 Operating Season
The Mesaba-Cliffs Mining Company
Calumet, Minnesota

Part	*Length of time used before being replaced*
Apex wear discs	One to two weeks
Vortex finders	Three to six months
Bottom cone sections	Once a season

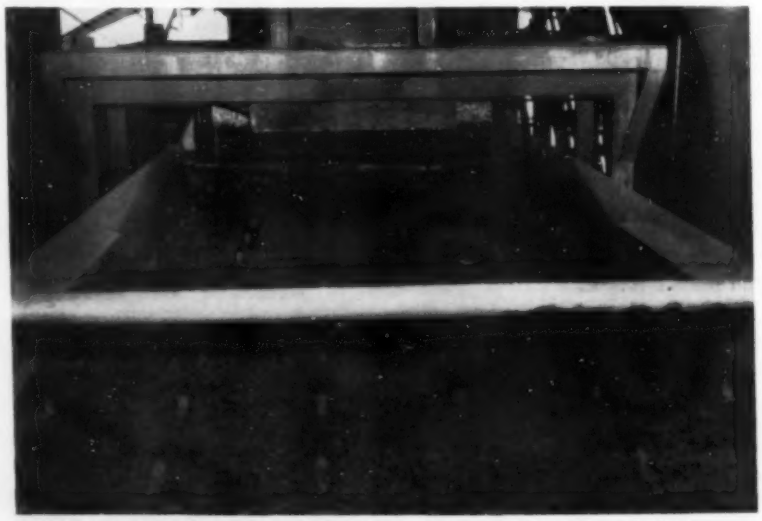
Cyclone Reject

Overflow from the cyclones also discharges onto a 5- by 10-foot drain screen, part of which is equipped with water sprays. The drain undersize portion, minus-28-mesh, joins the sink screen drain undersize and is returned to the circulating media system as previously described. The washed undersize material goes to two 36- by 36-inch primary drum separators, and the washed oversize fraction is sent to a 36- by 36-inch secondary drum. The sands and overflow from the two primary drums also are sent to the secondary; the sands from the secondary then flow to a 72-inch spiral dewatering classifier, from whence they are conveyed to the reject bin. The classifier overflow is pumped away as tailing.

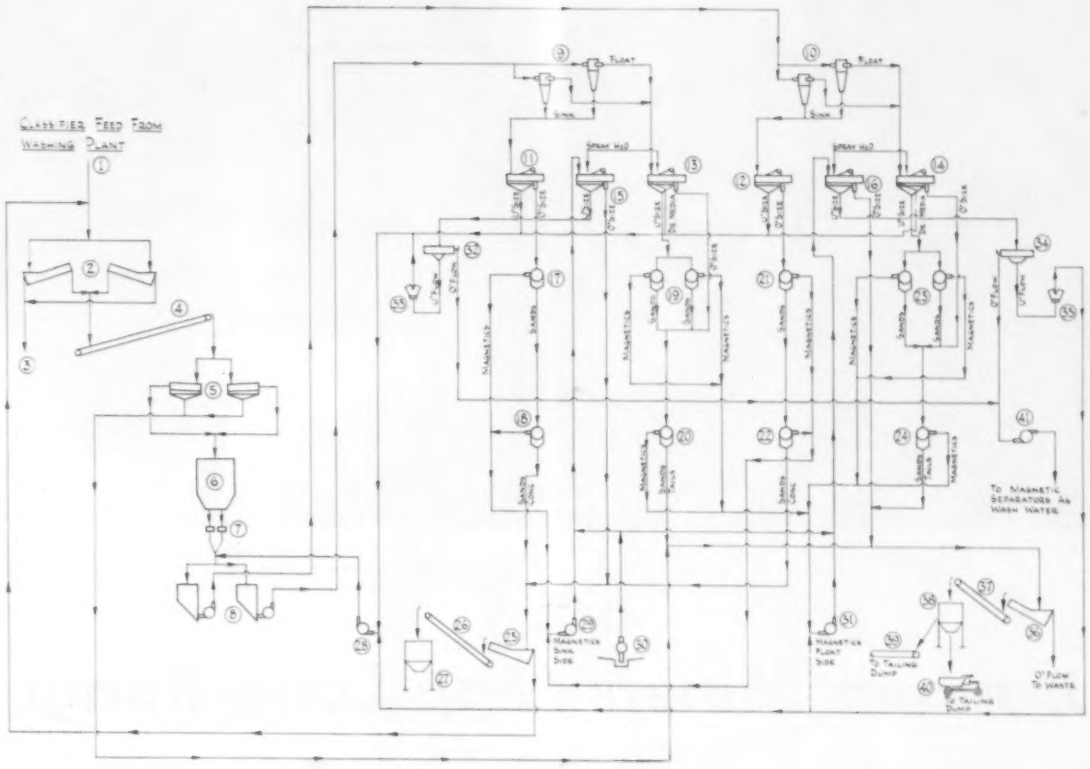
Magnetics from the primary as well as the secondary separators are pumped to a separate 5- by 8-foot float tramp reject screen, in the same manner as the sink magnetics. Screen oversize goes to the reject dewatering classifier and the washed undersize joins that from the sink tramp screen in a mixing box and thence to another 30-foot thickener. The mixing box ahead of the two 30-foot thickeners is necessary because of the great difference in volume and structure of the media appearing with the float (approximately 80 percent of the media fed to each cyclone is discharged as float). This box is designed with an internal gate so that flow of return media to the two thickeners can be regulated at will. The thickener overflow is recirculated in the plant as spray water; the underflow is pumped by an 8-inch triplex diaphragm pump into the circulating media circuit.

Make-up media, as needed, is added to the circuit by means of a sump pump in the plant basement.

(*Continued on page* 79)



SINK DRAIN SCREEN which receives the cyclone underflow. The sink drain screen undersize is returned to the feed circuit as circulating media. Screen oversize is sent to a primary 36-inch by 36-inch magnetic separator.



1, Feed from washing plant.
2, Classifiers, Akins, 66-in (2).
3, Classifier overflow to waste.
4, Belt conveyor.
5, Dewatering screen, 6 by 20 feet (2).
6, Surge bin, 100-ton.
7, Roll Feeder, Wemco, 16- by 30-inch (2).
8, Pump, Wemco, 8-inch (2).
9, Cyclone, Cast Ni-Hard, 15-inch (2).
10, Cyclone, Cast Ni-Hard, 15-inch (2).
11, Sink drain screen, Symons Type "F", 5 by 10 feet.
12, Sink drain screen, Symons Type "F", 5 by 10 feet.
13, Float drain screen, Symons Type "F", 5 by 10 feet.
14, Float drain screen, Symons Type "F", 5 by 10 feet.
15, Sink tramp screen, Symons Type "F", 5 by 8 feet.
16, Float tramp screen, Symons Type "F", 5 by 8 feet.
17, Magnetic drum separator, Dings, 36- by 36-inch.
18, Magnetic drum separator, Dings, 36- by 36-inch.
19, Magnetic drum separator, Dings, 36- by 36-inch (2).
20, Magnetic drum separator, Dings, 36- by 36-inch.
21, Magnetic drum separator, Jeffrey, 36- by 36-inch.
22, Magnetic drum separator, Jeffrey, 36- by 36-inch.
23, Magnetic drum separator, Jeffrey, 36- by 36-inch (2).
24, Magnetic drum separator, Jeffrey, 36- by 36-inch.
25, Concentrate dewatering classifier, Akins, 72-inch.
26, Belt conveyor.
27, Concentrate loading bin.
28, Pump, Allis-Chalmers, 8- by 6-inch (2).
29, Pump, Wemco, 4-inch.
30, Verticle wet sump pump, Amsco Nagle, 2½-inch.
31, Pump, Wemco, 4-inch.
32, Thickener, 30-foot-diameter.
33, Diaphragm pump, Triplex Denver, 8-inch.
34, Thickener, 30-foot-diameter.
35, Diaphragm pump, Triplex Denver, 8-inch.
36, Tailing dewatering classifier, Akins, 72-inch.
37, Belt conveyor.
38, Tailing loading bin.
39, Belt conveyor to tailing pile.
40, Trucks to tailing pile.
41, Pump, CWG Allis-Chalmers, 8- by 6-inch.

Flowsheet of The Mesaba-Cliffs Mining Co.

Cyclone Section, Hill-Trumbull Plant

Calumet, Minnesota

MINERS THRONG to register at National Western Mining Conference sponsored by Colorado Mining Association in Denver, Colo., early in February. They came from everywhere. One with a badge from Mississippi said his company, a major oil firm, sent him to convention to learn about uranium geology. Another, from a major copper firm, wanted to buy into uranium mining.

Uranium Miners Map Long-Range Expansion at Colorado Convention

Is the uranium mining industry in the United States at a crossroads? Does the United States Atomic Energy Commission's policy extend beyond 1962? Does the uranium ore refiner have protection and assurance through long-term contracts? How much uranium ore will be needed in the future for nonmilitary uses? Are adequate milling facilities now available?

Speaker after speaker at the National Western Mining Conference sponsored by the Colorado Mining Association in Denver, Colorado, the first week in February asked these and similar questions. Other speakers gave their opinions and recommended solutions for many problems confronting the industry—now and in the future.

Newest and Fastest Growing

Whatever the differences of opinions on the questions above, none of the more than 2,500 mine operators, claim owners, and prospectors in attendance disagreed with the statement of one of the convention's early speakers. He was Eugene B. Hotchkiss, vice president, Vitro Corporation of America, New York; his positive statement was that uranium was the newest and fastest growing segment of the mining industry and to call it exciting was an understatement. He foresaw no scarcity of ores and said that uranium reserves had 100 times the energy of coal reserves.

What About Long-Range?

A dramatic plea for greater long-term assurance for uranium was voiced by Dr. Phillip L. Merritt, consulting engineer, E. J. Longyear Company, New York. It should be remembered that Dr. Merritt recently resigned as assistant director, Division of Raw Materials, Atomic Energy Commission, and is exceptionally well qualified to know the uranium industry and its successes and problems. He said that success in search was due to the ease of detection with a Geiger counter that anybody could use, profits were available for successful effort, and wide spread publicity of "uraniumaires" increased interest.

He asked that the industry set its thinking toward achievement of a uniform concentrate price because the industry needs price stability over a long term. He said that the refiner operated only by means of a short-term contract. He warned of the termination of the domestic uranium program as now set for March 31, 1962.

Why Won't AEC Buy Ore?

A number of important questions were asked the Atomic Energy Commission by Norman Ebbley, Uranium Ore Producers Association, Grand Junction, Colorado, in a speech titled, "Suggested Revisions in Government Policies Affecting the Uranium Industry." He asked "Why has the commission radically curtailed production from certain mines in the Chinle-Shinarump formations? It is understood that Utex, Cal Uranium, and Homestake have been cut back on their production. Are the stockpiles of this type of ore getting too big? "These three producers are all in the Big Indian district south of Moab.

WELCOME TO COLORADO is the word from Robert S. Palmer (above left) as he shows the program to Colorado Plateau uranium producers. Vance Thornburg, second from left, told the convention about the rich Saguache County pitch-blende discoveries made in 1954 by prospectors. Thornburg Mining Company bought claims and is developing them. SENATOR ALAN BIBLE of Nevada (upper right) pays tribute to his predecessor, Senator Pat McCarran, who for such a long time was the featured speaker at the Sowbelly Dinner. Senator Herman Welker of Idaho, seated, came from Washington, D. C., to join in the special tribute. Senator George Malone of Nevada was also in attendance at the convention. URANIUM, GOLD AND SILVER BANQUET table (right) showing only a few of the important mining industry leaders and their wives. This is a view of a portion of the head table as pictured by international TV.

HERE'S HOW TO FIND URANIUM, reports one of the representatives at the special exhibit of Engineers Syndicate Ltd. Every type of scintillator and counter was studied by miners.

PHOSPHATE MINING growth is told by J. G. Miller, Westvaco Mineral Products, Newark, Cal. E. D. Dickerman, newly elected president of the Colorado Mining Association, listens.

URANIUM GOLD AND SILVER BANQUET speakers were from left: Vernon Pick, MINING WORLD's Miner of 1954; Admiral Lewis L. Strauss, chairman, United States Atomic Energy Commission; and Floyd Odlum, president, Atlas Corporation. These speakers told of bright future of uranium to 2,000 miners and their wives.

Also at the convention it was disclosed that the AEC was curtailing purchase of wet ore. This is surprising because any one with operational experience in mining knows that many mines are wet and treatment of wet ore is carried out as a normal part of milling operations.

How Big Will Uranium Boom Get?

No one knows what the limits for the uranium boom are or will be. It is evidently bigger than many people thought before the convention, according to Walter F. Tellier, Jersey City, New Jersey, uranium stock underwriter. He said that his firm had sold stock in about 15 companies to more than 27,000 investors in the United States. Surprisingly, much Colorado Plateau uranium stock is being sold in South America and Japan, he reported.

Industrial Future Bright

Peacetime uses for atomic energy are growing in importance was the theme of the two major speakers at the Uranium, Gold, and Silver Banquet. More than 2,000 miners and their wives heard Admiral Lewis L. Strauss, chairman of the United States Atomic Energy Commission, say that the newest provisions in the Atomic Energy Act "open the way to the eventual establishment of a self-sustaining power industry." Also that, "the new act provides for a pool of atomic knowledge and material with friendly nations, and for the participation of private industry in developing peacetime uses for the atom."

The second speaker at the banquet, Floyd B. Odlum, president of the Atlas Corporation which purchased the Delta mine of Vernon Pick for $9,000,000 plus, told of expansion plans at the mine and how ore reserves had been doubled to 600,000 tons since the purchase. Mine operations are now carried out by the Hidden Splendor Mining Company. He predicted that peacetime uses for the atom would be so great that the nation may face a shortage of uranium ore. He added that "to furnish initial inventory for power plants will require more than one half million tons of average grade ore yearly." He "expected ore production will have to be close to 1,000,000 tons a year by 1965, and well over 3,000,000 tons a year within three to five years thereafter."

Zinc and Lead Important

Since its formation at Colorado Mining Association convention in Denver two years ago, the National Lead and Zinc Committee has carried on an effective campaign to seek remedial action by the federal government because of damages incurred from excessive imports of foreign lead and zinc. Members of the committee again met in Denver to formulate further plans and report to the industry at the convention.

At a special Lead and Zinc Session, reports from committee members and other base metal miners were presented. The present state of the zinc industry and what to look for in the future were discussed by Richard Young, vice president, American Zinc, Lead and Smelting Company, St. Louis, Missouri. He said that the statistical position in regard to zinc supplies and requirements was better now than for any time within the last four years. He added, "The biggest event in the zinc industry in 1954 was the purchase of zinc by the federal government for the permanent stockpile. This prevented the price for zinc from dropping to 9.0 cents per pound."

For the immediate future, he said, the industry is faced with the problem of what can be done to be certain that the proper amount of zinc is produced from domestic zinc mines to assure an adequate mobilization base. In conclusion he said, "Don't belittle stockpile aid to the domestic zinc miner."

Committee Seeks Action

Otto Herres, chairman of the National Lead and Zinc Committee, told the convention that the program and objectives of the committee continued to be sound. Also that the industry had proven its case as to damages from excessive imports with the result that the bipartisan United States Tariff Commission by a unanimous decision in the summer of 1954 recommended a curb on excessive imports of foreign lead and zinc.

He also said that the program and objectives of the committee remained the same, and that, while some progress had been made in Washington, the imports of foreign lead and zinc must be limited.

Fluorspar Fights, Too

The plight of the producers of domestic fluorspar was voiced by Gill

Montgomery, general manager, Fluorspar Division, Minerva Oil Company, Eldorado, Illinois. It parallels that of many lead-zinc producers in that foreign imports of all grades, except ceramic, cause severe havoc in the industry. He went on to say that the domestic producers sought relief in 1954 by seeking a "higher protective tariff, rescinding the GATT concession on acid grade before the Committee on Reciprocity Information, and a stockpiling program on metallurgical grades." He added that in view of Washington trends " . . . the stockpile program, when once formulated, will be fairer and more permanent than the original plan could have been."

Mr. Montgomery was optimistic about the future of fluorspar and noted that the trend was toward higher prices. Prospects for the uses of fluorspar were good too, notably so for use in steel and aluminum furnacing, in the fluorine chemical industries, and also that ceramic fluorspar users see a better demand in the year ahead.

New Officers for 1955

Members of the Colorado Mining Association elected the following officers for 1955: Charles A. Chase, Silverton, honorary president; Edward D. Dickerman, Denver, president; M. P. Cloonan, Cowdry, 1st vice president; G. T. Rummel, Grand Junction, 2nd vice president; Max W. Bowen, Cripple Creek, 3rd vice president; Walter E. Burleson, Salida, 4th vice president; D. W. Viles, Durango, 5th vice president; H. W. C. Prommel, Denver, treasurer; and Robert S. Palmer, Denver, executive vice president.

ZINC-LEAD spokesmen from left to right were: E. P. Lupton, Lupton Mining Company; Ben F. Stapleton, Jr., Shenandoah-Dives Mining Company; Richard Young, American Zinc, Lead and Smelting Company; Frank A. Wardlaw, Jr., International Smelting and Refining Company; and Robert L. Jones, Jones Lead and Zinc Mines Company.

Summation

Those who sought information on how to invest in uranium mining, advice for those seeking methods to find uranium, and warnings for those who might have thought that the mining of uranium was an easy get-rich-quick utopia all learned many facts about uranium at the meeting. The Colorado Mining Association performed an outstanding service to all in bringing together the greatest assemblage of uranium talent anywhere. The jam-packed sessions underway in three halls at the same time in two separate buildings attested to the interest in uranium and the success of the meeting in disseminating authoritative information on such a large scale.

While the AEC can and must determine the long-term basis for a profitable uranium mining industry, the members of the industry and their state and local associations will play an increasingly important part. The role of others than the AEC was highlighted at the meeting along the following lines: What is a legal uranium discovery on the Colorado Plateau?, How will the industry police itself in regard to poor reports, and unethical practices? How will the flow of venture capital be maintained?

The year ahead will see much time and effort expended on the solution of these and other questions. It is fortunate that the Colorado Mining Association sponsored this meeting as the logical starting place for their solutions.

URANIUM MILLING, MINING, DRILLING were discussed by these three speakers. From left to right are: Marvin Kay, mgr., Climax Uranium Co.; Merritt K. Ruddock, president, Cal Uranium Co.; and Sven R. Palmquist, Fagersta, Sweden. Mr. Palmquist came from Sweden to discuss application of cemented carbide-tipped drill steel in Colorado Plateau uranium mines.

IKUNO TODAY showing mills, smelter, and surface plant. Operations have been almost continuous since year 807 A. D.

Ikuno Proves Good Mines Never Die

The history of the mines of Japan, like much of the country's history, can be traced back for hundreds of years, and the Ikuno mine of the Mitsubishi Metal Mining Company, can rate along with the gray beards in that its history is known back to the year 807 A.D.

The mine is located in Hyogo Prefecture in the southern part of Honshu, Japan's main island. For centuries it was worked for silver, and the richness and power of the Himeji Shogunate, the owners, was due directly to the products of this mine. As the workings reached greater depths, the tenor of the ore changed from predominately silver to copper and tin with some lead and zinc. The mine then became famous for the bronze made from the copper and tine extracted from the ores.

At present the mine is producing 800 tons per day with an average assay of 1.2 percent copper, 0.25 percent lead, 2.1 zinc, 0.25 tin, 0.3 arsenic, 0.2 grams gold, and 45 grams silver per ton. The veins are steep dipping fissures, with strong walls. They range from 3 to 7 feet in width and are noted for their extreme lengths, sometimes up to 10,000 feet. Mining is by shrinking stopes and great stress is put on mine safety and cleanliness.

Recover Five Concentrates

Due to the complex nature of the ore, many problems are encountered in milling with the result that the flowsheet includes many stages of crushing, grinding, flotation, and gravity concentration. Five concentrates are produced, namely; copper, tin, lead, zinc, and arsenic. The major problem is to separate the cassiterite without oversliming, and then to grind the balance of the pulp fine enough to produce concentrates of the other metals. Many different types of flotation machines are used in the mill such as K&K, SW, and "Sub-A" flotation machines, Rake and Esperanza classifiers, cone and cylindrical-type ball mills, and concentrating tables can be counted by the dozens.

The tin concentrate is smelted in an electric furnace plant alongside the concentrator. This smelter has a capacity of 10 tons per day and is used for smelting tin concentrates from other mines in the district as well as those from Ikuno. The copper, lead, zinc and arsenic concentrates are shipped to various smelting plants in other parts of Japan.

Reserves Assure Long Life

Tailing disposal is a tremendous problem because the mine is located in a rich agricultural area and any pollution of the streams is strickly watched. Tailing is dewatered and deslimed by means of thickeners and classifiers. The sand is transported by aerial tram to a valley across from the mill and at an elevation of about 400 feet above the mill discharge. This sand is used for making and building the dam which is in turn faced with waste boulders from the mine. The slime is pumped from the tailing plant to the pond by centrifugal pumps. Dam collapse and overflow is carefully watched.

Management and labor maintain excellent relations and labor turnover is almost nil. Ore reserves are maintained at around 2,000,000 tons and the management and engineers state that enough data are known about the geology and tenor of the ore bodies so that the life of the mine can be foreseen for many years. So Ikuno's beard will continue to grow and get grayer.

MAN TRIP entering portal of one of several adits. Note the steel safety cars in which the miners ride to work. Narrow veins containing gold, silver, copper, tin, lead, zinc, and arsenic are mined by shrinkage stoping.

GSA Reports Achievements of Mn Research Projects

The critical shortage of metallurgical grade manganese ores for consumption and stockpiling during the Korean War forced the United States Government to look for a greater domestic supply. It was known that this country had large reserves of low-grade manganese ores and that another possible source was manganiferous slags from open hearth furnaces. The three largest, known potential sources of this domestic manganese are the open hearth slags, the ores in Aroostook County, Maine, and the manganiferous low-grade iron ores of the Cuyuna Iron Range in Minnesota. To determine whether it would be feasible to recover manganese from these and other sources, the Emergency Procurement Service of the General Services Administration has sponsored various research projects.

So far, six processes developed by private companies have been deemed promising enough to justify financial assistance by the government for further research and development work. These six companies are listed in the accompanying table with a brief description of their project. In addition, the following is a brief summary of the processes developed by each company.

Southwestern Engineering Company has performed extensive analyses and ore tests upon ores from Virginia, Tennessee, Arkansas, Maine, Arizona, and New Mexico. Flotation possibilities were studied principally, but tests were also made using gravity and heavy media methods. Also, a few tests employing leaching were performed.

The process developed by Mangaslag Inc. is pyrometallurgical entailing the reduction of ore in a vertical blast furnace to produce a spiegeleisen; then selective oxidation of the molten spiegeleisen in a special converter to produce a cinder containing the manganese, and a molten metal containing the iron and phosphorus. The cinder is then reduced in the blast furnace to produce ferromanganese. Blowing of the molten metal in a second converter produces dephosphorized steel melting scrap.

Manganese Chemical Corporation's process combines roasting and leaching of the ore using an ammonia solution, with the aid of CO_2 gas, and the recycling of ammonia. The final basic product is manganese carbonate which can be readily converted to manganese oxide in nodules for use in the steel-making industry.

The new Nossen Laboratories, Inc. process begins with a reducing roast (omitted in the case of some ores). A nitric acid solution is employed to dissolve the manganese in the raw or roasted material. The pregnant solution is decomposed by heat in specially designed equipment, thereby producing a solid product containing the manganese, and a vapor containing the nitrous fumes. The solid product is then treated by grinding and washing to give a high-grade manganese dioxide concentrate. The nitrous fumes are recovered in the form of nitric acid and recycled.

The process that Bruce Williams Laboratories will use involves roasting followed by leaching and precipitation, with recycling of the principal reagents. The novel use of certain reagents prevents it from becoming a duplication of some other already known methods.

The L. W. King process employs roasting and leaching, with hydrochloric acid as the leaching agent. The manganese, cobalt, and nickel are recovered separately as oxides, by a series of chemical operations involving the changing of the degree of acidity of the solution by the addition of reagents and changes in temperatures.

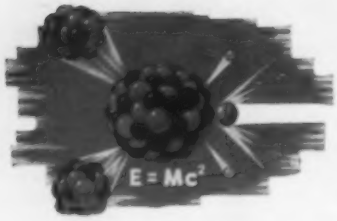
Diamond Alkali Company plans on using its Sylvester process. This is a roasting process whereby manganiferous slags and ores are converted pyro-chemically from a refractory state to a state amenable to concentration by magnetic separation. It is expected that the concentrate thus produced will permit further successful treatment either by leaching or smelting to produce manganese products for use by the steel industry.

Besides those projects by private companies, the U.S. Bureau of Mines has for a number of years been experimenting with the so-called oil-emulsion flotation process. In the case of low-grade ores this treatment would have to be followed by nodulizing or other means of agglomerating the product and eliminating base metal impurities.

Emergency Procurement Service
Manganese Research and Development Projects

Contractor	Southwestern Engineering Company	U.S. Bureau of Mines	Manganese Chemical Corporation	Nossen Laboratories Inc.	Mangaslag Inc.	L. W. King	Bruce Williams Laboratories	Diamond Alkali Company
Type of process	Gravity and flotation	Flotation	Ammonia CO_2 leach	Nitric acid leach	Special blast furnace and separation of Mn in converter	Hydrochloric acid leach	Special roasting and leaching	Lime roast followed by magnetic separation
Source of material	*3, 4, 5, 6, 8	8	2	3, 8	1, 3	7	1, 3, 6, 8	1, 3
Estimated date for conclusion of test work	Concluded	Continuing	May 1955	December 1955	June-January 1956	June 1955 extraction process January 1956 acid process	April 1956	June 1956
Remarks	Found that some ores, including the important Aroostook County ores, could be preconcentrated to advantage for possible treatment by other processes	To date only laboratory tests have been made	Work to date indicates favorable results	Work to date indicates favorable results	Pilot plant operation has not yet developed any definite data	Pilot plant now under construction	Pilot plant construction to be commenced soon	Negotiations for testing of process now in progress

*1, Slags, open hearth. 2. Cuyuna Iron Range, Minnesota. 3. Aroostock County, Maine. 4. Artillery Peak, Arizona. 5. Batesville, Arkansas. 6. Virginia, Tennessee, Alabama. 7. Low-grade Mn, Ni, Co ores in Tennessee, and elsewhere. 8. Government stockpiles of submetallurgical ores at El Paso, Texas; Deming, New Mexico; Wenden, Arizona; Butte, Montana.



FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

Increased Use of Aircraft Seen in U_3O_8 Prospecting

Dodge Uranium Corporation, Denver and Grand Junction, Colorado, has announced that it is using a Bell G-47 helicopter to transport ore from its No. 1 Palisade Mountain mine in the mountainous area near Gateway, Colorado. The helicopter carries approximately 500 pounds of carnotite ore, running from 3.00 to 15.7 percent U_3O_8, on each load. The firm is taking down about 6 to 7 tons of ore per day from its mine and is shipping 12 tons every other day to the United States Vanadium Corporation mill at Rifle, Colorado. Dodge Uranium also owns a 1955 Piper Super Cub airplane which it uses for additional prospecting and checking of its properties.

Another company using airplanes in its prospecting work is Anaconda Copper Mining Company. Jack Knaebel, manager of New Mexico uranium operations, uses his Cessna 180 as often as many other miners user their jeeps. A new Bell helicopter has just been purchased for detailed aerial prospecting.

Aerial prospecting has become a common method for getting into some of the otherwise inaccessible areas of the Colorado Plateau's more remote areas, but Vernon Pick who sold his Delta mine to the Atlas Corporation, is using the $250,000 PBY amphibious airplane, which was part of the purchase price, for prospecting in other parts of the world. In February Mr. Pick left for South America with the twin-engine, 1,350 horsepower plane, which has a 3,000-mile cruising range, and plans a later trip to Canada. When on the Colorado Plateau, he usually uses either his twin-engine Aero Commander, a Cessna 190, or one of his two Super Cubs.

Newmont, Continental Oil Join in Uranium Search

Newmont Mining Corporation, its exploration subsidiary, Newmont Exploration Corporation, Ltd., and Continental Oil Company have joined forces for uranim exploration on the Colorado Plateau. Newmont is the largest independent holder of Continental stock and through its subsidiary, Newmont Oil Corporation, has previously joined with the firm in Gulf Coast oil exploration. Continental holds large areas of the Colorado Plateau under lease for oil and gas.

The first area to be drilled for uranium is the Summit Point district in San Juan County, Utah, almost straddling the Utah-Colorado state line. The area is about 15 miles northeast of Monticello, Utah and only a few miles south of the well known and extensively mineralized dranium-vanadium mines of Dry Valley.

Exploration drilling contracts have been awarded to a Denver, Colorado firm and several rigs have been moved to the district. Holes will be up to 1,000 feet in depth, have been started in the Dakota formation and will be drilled at least through the Brushy Basin member of the Morrison formation.

Federal Buys Control Of Canadian Uranium Firm

Great Northern Uranium Exploration Company, Ltd., with extensive claim groups in the Beaverlodge area of northwestern Saskatchewan, Canada, is now controlled by Floyd B. Odlum's Federal Uranium Corporation, which recently announced absorption of a group of United States uranium firms. (See page 93.) Federal has purchased all the outstanding 1,015,000 shares of Great Northern in exchange for 125,000 Federal shares.

Engineers for the United States firm are planning a development program for the new acquisition, whose nine claims are all within a 17-mile radius of the government-owned uranium refinery of Eldorado Mining & Refining Company, Ltd. Great Northern also owns shares in Dorado Uranium Mines, Ltd. and Skeena River Mines, Ltd.

Lucky Mc Uranium Corporation Open Pits Gas Hills Deposit

One of the richest uranium discoveries in Central Wyoming has been the Lucky Mc Uranium Corporation's open-pit mine located 50 miles east of Riverton, Wyoming. The above left picture shows operations at the deposit in the Gas Hills area of Fremont County. In the foreground, overburden is being broken up by a five-tooth ripper, preliminary to removal by scrapers. Center of this photo shows holes being drilled to reach the more massive high-grade ore below the surface. The above right picture shows a closeup of the blast hole loading. The deposit is located in the Wind River formation on the flank of the Gas Hills anticline. It is of Tertiary age. Below this formation additional uranium ores, of carbonaceous Thermopolis shale and the Morrison, have been found. These are lower in grade than the ore of the Wind River, which contains a type of uraninite. The ore is being sent to the newly opened U.S. Atomic Energy Commission buying station at Riverton, Wyoming. Mining and development work on the 3,280 acres of Lucky Mc claims and leases are being handled by New Park Mining Company and other affiliated Salt Lake City firms headed by W. H. H. Cranmer.

Muriel Sibell Wolle Describes

CAMPS IN DEADWOOD GULCH

The gold rush to the Black Hills of South Dakota in 1876 produced a dozen or more mining camps which sprang up almost simultaneously at the several diggings. Deadwood Gulch alone saw several of these hastily laidout camps, including Gayville and Central City.

Deadwood and Lead, built around the famous Homestake properties, are prosperous industrial cities today, with little about them that recalls their feverish beginnings, but two miles from Deadwood stands Central City, a town whose older buildings and crumbling fire-blackened foundations date from the days of its prime.

Gold was first found in the Southern Hills, and the town of Custer was made up of prospectors. In the fall of 1875, word of rich placers farther north caused a mad scramble to the new diggings. By summer of 1876, Deadwood Gulch was swarming with 25,000 people, all of whom were squatters on Indian land for the Black Hills were not legally ceded and opened to the Whites until February 28, 1877. But the lure of gold was stronger than the fear of Indian attack and men continued to pack in over the trails from Pierre, Bismarck, Sidney, and Cheyenne. It was wild, rough country, summed up by the phrase: "There's no Sunday west of the Missouri River and no God west of Cheyenne." But there was gold and there were hordes of determined men ready to hunt for it.

On Nov. 9, 1875, Wm. Gay, Alfred Gay, J. B. Pearson, Dan Muckle, Wm. Lardner, Ed McKay, Joe Englesley, James Hicks, and a man named Haggard camped on the banks of a creek and named the gulch, which rose on either side and which was choked with fallen timber and underbrush, Deadwood. The same day they laid out a campsite called Gayville, and began to stake claims. By December 1875, the Lost Mining District, the first established in the Northern Hills, was organized at Gayville with Wm. Lardner as recorder.

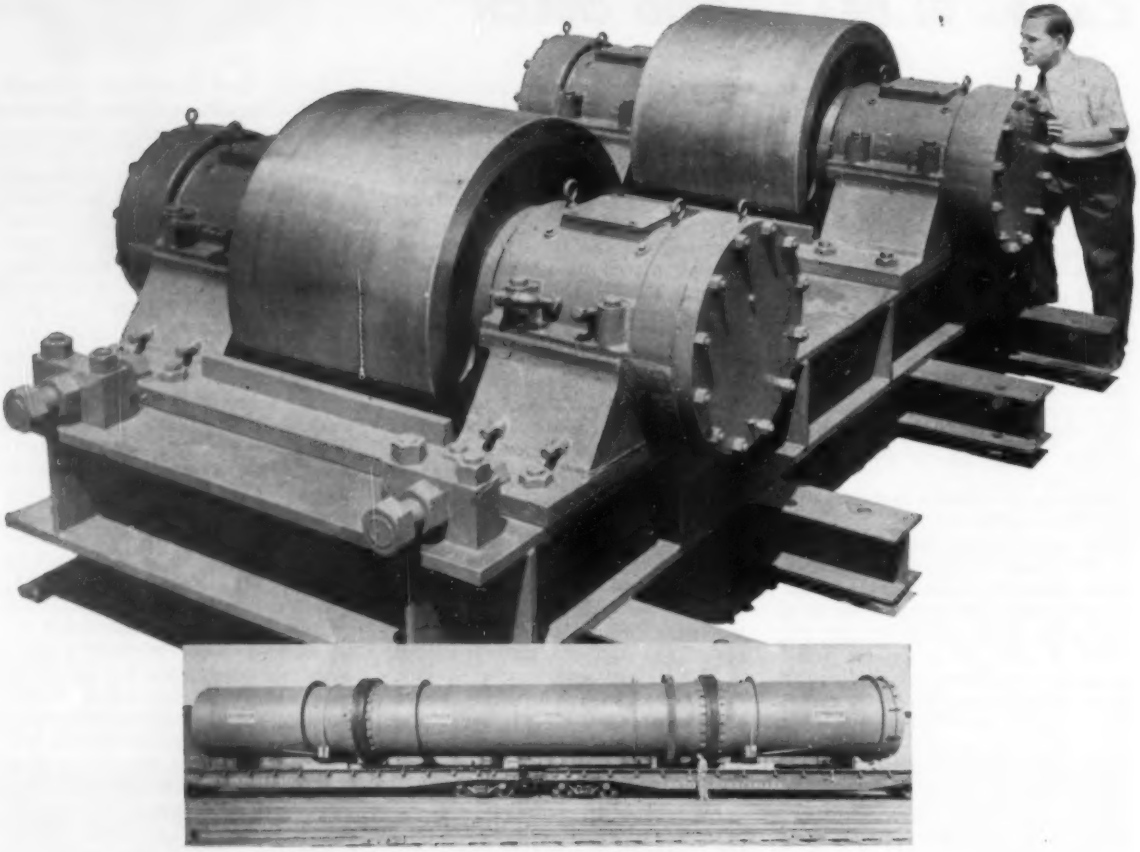
In July 1876, C. V. Gardner, one of the first prospectors to the region, took 700 pounds of ore from the Hidden Treasure mine to Cheyenne where "within 24 hours of his arrival" a company of 10 men was organized and he and a Mr. Jones were commissioned to obtain a mill for the property. Although Gardner thought it unwise, the men ordered a Blake crusher and Bolthoff ball pulverizer instead of a stamp mill, and this was packed into the Hills. As Gardner feared, it was not satisfactory; still, from it, $20,000 in gold was recovered by the end of the year. Gardner then ordered a 20-stamp mill which was erected at the upper end of Gayville, but before it could operate, his mine was in litigation and it was some time before he could prove his rights to it. The first mill therefore to drop stamps was brought in by Milton E. Pussey to handle ore from the Alpha mine.

As early as August 1876, Gardner built the first arrastra in the Northern Hills, one mile above the mouth of Blacktail Gulch, and with it extracted ore from the Chief of the Hills claim. The first cleanup was valued at $21. Other arrastras were soon constructed, including four powered by steam which were placed in a building erected by Nicholas Hayden & Co. to treat ore from its Golden Gate mine. Even so, "the rock before being placed in arrastras will be crushed in a machine similar to that used by Gardner & Co."

Henry Keets located the Comstock (or Keets) mine in Hidden Treasure Gulch in 1876. The following spring, Cephas Tuttle located the Aurora mine, "so that its lines overlapped ground already located by Keets." Not long afterwards Tuttle decided to "jump" the Keets mine by dynamiting it. Keets watched Tuttle push wheelbarrows loaded with boxes of powder toward the shaft of the Aurora mine and asked him what he was up to? "Just going to blow everything to hell," Tuttle replied, tying a rope around the boxes of powder and lowering them into the shaft. Since both mines were connected by a long tunnel, Keets rushed word to his men who were underground to get out fast, and all but one named Norris ran to Keet's cabin or to his blacksmith shop. As Tuttle lighted a fuse and started to lower it into the shaft, a shot extinguished the light. Tuttle relit the fuse and hurried off but not before men on both properties began shooting at each other. A couple were hurt and Tuttle was killed. Norris was knocked unconscious by the blast and was deaf the rest of his life. Although some of the Keets men were arrested and charged with Tuttle's murder, there was insufficient proof to convict anyone.

Central City, South Dakota. Main Street and the heart of the business section.

NEED 'EM RUGGED--
Western Style?



CALL ON **STANDARD**

Take a look at the ruggedness of the trunnion assembly pictured in the top photograph. These are trunnions for a 10 ft. diameter by 150 ft. long *STANDARD* kiln, just completed. Another *STANDARD* kiln mounted on flat cars, ready for shipment, is shown in the inset photograph. Both illustrations tell more graphically than words why *STANDARD* so often gets the CALL when the need is for rugged dependability. There's nothing skimpy about *STANDARD* Rotary Equipment. It is built *to last*, like the Company behind it. Now celebrating our 50th year of heavy engineering progress. WRITE TODAY FOR FULL DESCRIPTIVE LITERATURE

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United States

Personalities in the News

VICTOR J. HAYEK (left), for 20 years secretary of the Mining Association of Southern California (now the Mining Association of the Southwest) was honored by the group at a special luncheon meeting. In token of his years of service to the industry, Mr. Hayek was presented with an onyx desk stand with a gold figure of a miner panning gold. The presentation was made by JOHN EGGERS (right), present secretary of the association. Mr. Hayek is now serving as a Commissioner of the Superior Court in Los Angeles County, California.

B. B. (Barney) Greenlee, former manager of the Resurrection Mining Company at Leadville, Colorado, and more recently manager of Western Nickel Ltd. at Hope, British Columbia, now has headquarters in Montrose, Colorado. At Hope he supervised deep exploration for Newmont Mining Corporation and Pacific Nickel Mines, Ltd. From his Montrose headquarters he manages Resurrection in addition to doing uranium exploration work for Newmont Exploration Company, Ltd.

Fred E. Burnet, Montana Phosphate Products Company, has been elected president of The Mining Association of Montana, succeeding **Ted E. Collins** of Helena.

Floyd E. Bowen, manager of Florida phosphate operations, International Minerals and Chemical Corporation, has been promoted to division production manager. He will continue to oversee Florida operations and in his new capacity will also supervise other operations of the division, including mines, plants and offices in Tennessee. Other promotions at the division include **Otis Allen**, who was named assistant to the production manager, and **Sanford R. Bell**, who has been named chief engineer.

LOUIS A. PANEK, Applied Physics Branch of the United States Bureau of Mines, College Park, Maryland, has been selected as the Warren Lecturer for 1955 at the Minnesota School of Mines and Metallurgy. The lectureship was established to promote effective teaching and education in the mineral industry field by bringing outstanding American and foreign lecturers to the university. Dr. Panek's series of lectures will be on rock mechanics and the design of mine openings. He has been actively engaged in the research of mining methods for many years and has been with the U.S. Bureau of Mines since 1949.

Manning W. Cox, mining geologist, has resigned his position as chief geologist, Northwestern Mining Department, American Smelting and Refining Company. He intends to devote most of his time to several private mining enterprises and consulting work. Mr. Cox has had mining experience throughout the United States and in Canada, Alaska, Peru, Cuba, and North Africa. Before his association with ASARCO, he was employed by United States Smelting Company and the United States Geological Survey.

Officers of the Arizona Uranium Ore Producers Association were reelected by the group at a recent meeting. They include **"Woody" Nichols**, Higley, president; **Thomas Oster**, Phoenix, vice president; **Harold Beelar**, Miami, secretary; **T. J. Long**, Globe, treasurer. **Maurice Sharp**, Globe, was named to the new post of second vice president.

John H. Simpson, formerly foreman of the Black Rock Mining Corporation's Lincoln mine at Tempiute, Nevada, has been sworn in as deputy mine inspector for northern Nevada. He replaces **Paul Piscevich**, who resigned early this year.

John C. Humm, Harrisburg, Illinois, is the new president of Hicks Creek Mining Company, Elizabethtown, Illinois. Also elected at a recent meeting of the company's board of directors were **Ted Joiner** and **C. C. Mackey**, vice presidents; **C. L. Flynn, Jr.**, secretary; and **Myrell Conn**, treasurer.

John A. Reeves, chief engineer for Independent Coal and Coke Company at Kenilworth, Utah, has resigned that post to become mining engineer at the Soda Springs, Idaho phosphate operation of Monsanto Chemical Company.

Florence I. Bayley has been elected president of Spokane Molybdenum Mines, Inc., Spokane, Washington. She succeeds her father, the late **Luke G. Bayley**, whom she served as assistant during the past two years.

Franklin E. Johnson, mine shift foreman at United States Potash Company, Carlsbad, New Mexico, has been promoted to the position of mine mechanical supervisor. He has had wide experience as a mining engineer in the United States and the Philippines.

Gordon McMillan, former mine foreman at the Brittanica Beach, British Columbia properties of Howe Sound Company, has been appointed general superintendent for Chief Consolidated Mining Company, Eureka, Utah.

Fred Stewart, general manager of Southwest Potash Corporation, has been named a vice president of the company. He will continue as manager of Southwest's potash mining and refining operations in New Mexico.

Howard N. Farmer, Jr., has joined the development and research division of The International Nickel Company, Inc. as a member of the West Coast Technical Field Section, Los Angeles, California. Before coming to International Nickel he was associated with Dresser Operations, Inc., Whittier, California.

A. E. MILLAR (right), general manager of Anaconda Copper Company's Yerington mine at Weed Heights, Nevada, was named president of the Nevada Mining Association for 1955. He succeeds JOHN C. KINNEAR, general manager for Kennecott Copper Corporation's Nevada properties. Other officers for the coming year include NORMAN E. HANSON, assistant to the president, Basic Refractories, Inc., who was elected first vice president; and ROY A. HARDY, Reno mining engineer, second vice president. LOUIS GORDON is executive secretary of the association.

Frank R. Hunter has been appointed division geologist for the Industrial Minerals Division of International Minerals and Chemical Corporation, Chicago, Illinois. He will direct an expanded exploration program for the division.

John Wood, former president of the New Mexico Mining Association, is chairman of the newly organized New Mexico section of the American Institute of Mining Engineers.

Verne D. Johnston, mining engineer for Oglebay, Norton & Company, has retired after serving with the company since 1913. He will remain with the firm as a consultant. Also on the Iron Range, **E. J. Fearing**, general superintendent of the Hibbing district for Pickands, Mather and Company, retired from active service December 31. He has been succeeded by **M. L. Bradt**, assistant general superintendent.

Operations at the White Pine Copper Company smelter began shortly after the first of this year. Shown examining the first pour from the converter furnace at the White Pine, Michigan project are (left to right) MORRIS F. LACROIS, president of the White Pine and Copper Range companies; HAROLD B. EWOLDT, vice president and project manager for White Pine; and ROBERT C. WILSON, smelter superintendent. The new smelter is expected to produce 75,000,000 pounds of pure copper per year. The White Pine project, including mining and milling operations which have been underway for some time, is the first copper sulphide deposit in the Upper Peninsula of Michigan to be developed for large-scale mining—earlier production in the area had been confined to native copper deposits. (See page 85 for latest details on White Pine.)

John F. Dugan, general superintendent of mines for International Smelting and Refining Company, has retired from that post for the Utah-Nevada subsidiary of Anaconda Copper Company. A long-time employe of the company, Mr. Dugan will remain in Salt Lake City, Utah as a consultant to Anaconda.

George N. Morthland, assistant chief engineer, was named to succeed chief engineer **J. D. Johnson,** head of the engineering and construction department, Homestake Mining Company, Lead, South Dakota. **Harold J. Sliper** was named as assistant chief engineer.

Fred J. Hoff, who recently completed a three-year operational assignment in the Philippine Islands, has joined the staff of Climax Molybdenum Company as chief research metallurgist. Recently joining Climax Uranium Company is **Robert J. Wright,** who was formerly chief of the geologic branch of the U.S. Atomic Energy Commission's Grand Junction, Colorado office.

Mason W. Rankin, well-known mining geologist in the Leadville, Colorado area, has been elected to the board of directors of Utco Uranium Corporation, Denver, Colorado. Other board members are **Fred C. Clymer, J. B. Claybaugh, H. C. Thompson, John Alff,** and **Horace B. Maltby. George S. Casey** is president of the company, which recently developed a small ore body at East Canyon near Monticello, Utah.

Lauren A. Wright, geologist with the California State Division of Mines, was named president of the American Institute of Mining and Metallurgical Engineers' Southern California section. Vice chairman for mining during the year will be **Blair W. Stewart,** Harvey S. Mudd mining interests. **Richard F. Brooks,** manager of mines, Gladding, McBean & Company, is vice chairman for industrial minerals.

KENNETH F. FARLEY (right) became director of smelting and refining at Calumet and Hecla, Inc.'s Calumet Division January 1. Former director **CHARLES W. JILBERT** will remain as advisor until his formal retirement June 1. Mr. Farley's appointment headed a group of organizational changes announced by general manager **A. S. KROMER.** Other appointments included **ARNE W. HILL,** who was named electrical project engineer, Operating Services Division; **AMOS C. TURNER,** electrical general foreman in the division; **JOHN R. MARTIN,** who has joined the industrial engineering staff; and **HARRY D. BENNETTS,** new maintenance engineer.

F. M. Hamilton, who has been supervisor of agglomeration research at Jones & Laughlin Steel Corporation's Ore Research Division laboratory, Negaunee, Michigan, has been appointed to a similar capacity at the firm's New York Ore Division. Mr. Hamilton has been engaged in agglomeration research for Jones & Laughlin since 1940. He joined the firm in 1934.

James S. Quidor now heads the Las Vegas, Nevada field office of the United States Atomic Energy Commission. He succeeds **Craig Voorhees,** who has been transferred to the AEC office in Buffalo, New York.

Lyle M. Barker, manager of the Morenci branch, Phelps Dodge Corporation, was re-elected chairman of the Arizona Section, American Institute of Mining and Metallurgical Engineers.

W. Church Holmes, formerly metallurgist and mining engineer with the Sunshine Mining Company of Idaho, has become general manager of the Mohawk mine and mill, a Bru-Hi Enterprise operation, in Esmeralda County, Nevada.

Philip F. Beaudin, senior vice president of Copper Range Company, Boston, Massachusetts, retired December 31 after 50 years in the mining industry.

OBITUARIES

George A. Tweedy, 77, consulting mining engineer, died January 19 in Phoenix, Arizona. Mr. Tweedy, a graduate of Massachusetts Institute of Technology, moved to Phoenix from Los Angeles, California 12 years ago.

Ernest W. Davis, 64, director of engineering for the Simplex Wire & Cable Company, died on January 11 of a heart attack. He had been with the engineering department of the firm since 1931 and had served in a progression of engineering posts until 1950 when he was named director of engineering.

Newsmakers in International Mining

JAMES BOYD, manager of Kennecott Copper Corporation's exploration department since 1951, has been named vice president, exploration, to succeed ANTON GRAY, who recently resigned because of ill health. Prior to joining Kennecott, Dr. Boyd was director of the United States Bureau of Mines for nearly five years. He has served as dean of the faculty, Colorado School of Mines, Golden, Colorado, and in 1945 helped to reorganize and reestablish German mines, mills, plants, and other industries as director of the Allied Military Government's Industry Division.

Phillip L. Merritt, former assistant director for exploration in the United States Atomic Energy Commission's Division of Raw Materials, has resigned his government position to accept the post of senior geologist with **E. J. Longyear & Company,** consulting geologists and mining engineers. Dr. Merritt will maintain offices in New York City. Replacing him as acting assistant director at the AEC is **Robert D. Nininger,** who has been deputy assistant director for exploration.

John H. White, Jr., until recently president of Climax Uranium Company, has been named to supervise the uranium expansion program for Standard Ore and Alloys Corporation, New York City.

David D. Baker, formerly with the Utah Construction Company, has been appointed deputy director of the mining division, Grand Junction Operations office, U.S. Atomic Energy Commission. Mr. Baker, who joined the AEC last July as a staff engineer in the exploration division, succeeds **John J. Curzon** who resigned to become manager of Climax Molybdenum Corporation's exploration department. Before joining the AEC Mr. Baker was employed by the Utah Construction Company as manager of a contract between the firm and the Korean Government for the rehabilitation of tungsten mines in that country.

Merritt Pharo, official of Johnson's Company, Ltd., Canadian asbestos firm, has returned from a trip to Australia.

Harlan Walker, general manager for Marcona Mining Company in Peru, has resigned that position. The company is a joint operation of Utah Construction Company and Cyprus Mines Corporation.

Vincent G. Rumpf, mining engineer of the Compania Minera Choco Pacifico, Columbia, has recently been appointed chief recovery engineer for the firm.

A group of American newspaper and magazine writers were taken on a tour of the recently discovered Republic Steel Corporation rutile deposit in southwestern Mexico, Las Minas de Tisur (Titanium of the South), in the province of Oaxaca. Guiding the group was **Donald B. Gillies,** mining consultant and former vice president for Republic, who is credited with finding the rich titanium deposit. Also in the Republic group were **Edgar S. Bowerfind,** public relations director; **Willis A. Seaman,** geologist; **Ward H. Broadfield,** manager of mining operations.

F. E. Weldon, N. A. Timmins Limited, has been appointed to the post of assistant to the president and resident enginer, Montreal, Canada. He will co-ordinate the exploration activities of the company and direct the work in Quebec and eastern Canada. Activities in Ontario and western Canada will continue under the direction of **Leonard G. Smith,** manager and resident engineer of N. A. Timmins Explorations (Ontario) Limited, Toronto.

Luis A. Nogales has resigned from the Bolivian Mining Corporation and is now working as a consulting mining engineer in La Paz, Bolivia.

A. I. H. Lombard, who has been the underground manager for Griqualand Exploration and Finance Company, Ltd., in Kuruman, Union of South Africa, has returned to Northern Rhodesia where he has joined the Mines Department as an Inspector of Mines.

H. H. Schou, formerly manager of mines at the Hochschild's Compania Minera y Comercial in Santiago, Chile, is now employed by the Fresnillo Company in Zacatecas, Mexico.

R. N. Harle, assistant manager since 1951, has been appointed manager of Mufulira Copper Mines Limited, Mufulira, Northern Rhodesia. Succeeding him as assistant manager is mine superintendent **C. A. O'Connell.**

Five members of the United States Congress Joint Committee on Atomic Energy have completed their Asian tour of countries vital in the field of atomic energy. Included on the itinerary were Australia, India, and Pakistan. The team consisted of Senator **John W. Bricker,** and Representatives **W. Sterling Cole, Carl Hinshaw, James E. Van Zandt,** and **Thomas A. Jenkins.** Primary object of the tour was to get a picture of world needs, production capacities, and attitudes, and to encourage cooperation in the field of utilization of atomic energy for peaceful purposes.

The Pan-Malaya Scientific Advisory Council has set up a technical committee on mineral resources to assist Malaya's mining industry and to act as a clearing house for all matters regarding minerals and mineral resources. The advisory council was established by the Federal and Singapore governments and the University of Malaya. Chairman of the new technical committee is Professor **E. H. G. Dobby.**

William H. Leslie, member of the British Ministry of Labor and National Service, has been assigned to a one-year mission in Africa's Gold Coast by the United Nations International Labor Organization. He will train supervisors in the country's rapidly growing mining industry. Included in his interests during the coming year will be a new hydro-electric development on the River Volta, and gold, diamond, and bauxite mines in the area.

Bertil Astlind, mine superintendent for Boliden Gruv Aktiebolag in Adakgruvan, Sweden, is currently at the Nordic Mining Company, Ltd., operation at Mestersvig, Greenland. The lead producing firm was formed in 1952 by the Danish government and two Danish companies; Bolidan Gruv Aktiebolag and Store Kopparbergs Bergslags Aktiebolag in Sweden; and Ventures Ltd., Canada.

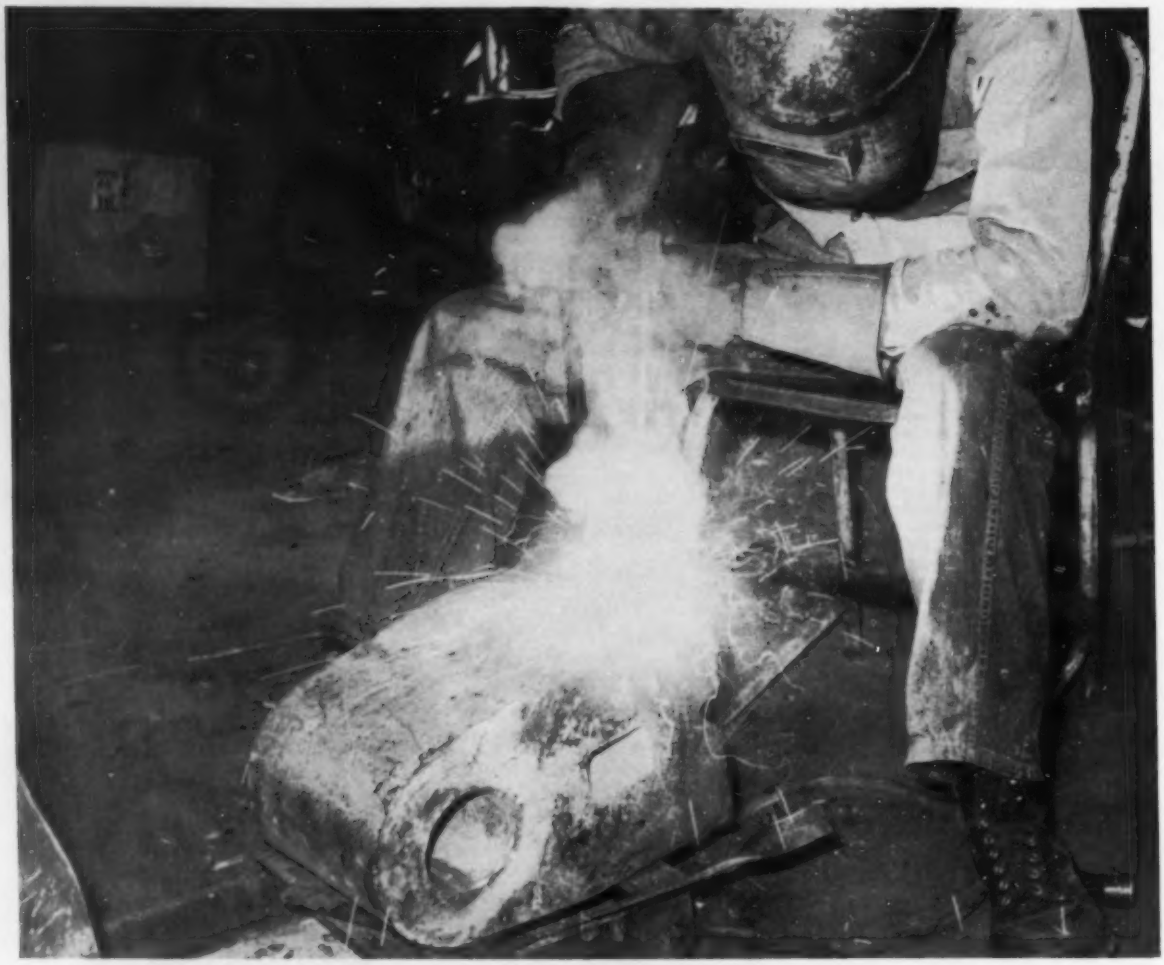
Sverre A. Wee, mining engineer from Lima, Peru, is now employed in Samsun, Turkey for Liman Insaati Kontrol Amirligi.

B. A. Corkill, until recently chief mineral dressing engineer for Rio Tinto Company, Limited, in Huelva, Spain, has taken up an appointment as consultant to the company in London.

Mauro L. Gonzales, senior geologist of the geological survey division, Philippine Bureau of Mines, is engaged in a one-year FOA-PHILCUSA traineeship in the United States. His special field of study during the year will be geology of non-ferrous minerals and laboratory investigations. Also participating in the FOA program are **Oscar Crispin,** who will specialize in study of geology of iron deposits and ferro-alloys, and **Pablo M. Capistrano,** senior geologist, who is receiving additional training in ore dressing and metallurgy.

Roger C. Baker, formerly district geologist with the U.S. Geological Survey at Little Rock, Arkansas, is now in Pakistan on a two-year assignment to assist in the development of a ground-water investigation program. Mr. Baker has been in charge of the ground-water program in Arkansas since 1946 except for a period in 1952 when he was on assignment to Libya with a similar assistance program.

ALAN PROBERT, for several years assistant director of the United States Bureau of Mines Foreign Minerals Region, has resigned to accept a position as vice president and general manager of the Compania Minera de Guatemala S.A. The Central American firm is a producer of lead, zinc, and silver ores and concentrates, and Mr. Probert's new headquarters will be in Guatemala City, Guatemala. Mr. Probert has been with the Bureau of Mines since 1949. He served as chief of the Bureau's technical assistance team in Mexico, before being called to Washington to head the agency's world-wide technical assistance program. Upon his resignation, Mr. Probert was awarded the Department of the Interior's silver medal for Meritorious Service.



KING SIZE SWING HAMMERS
Last 10 Times As Long With Stoody Hard-Facing

A large bauxite mill in the South crushes limestone used as a flux in the reduction of the ore. The hammer mill used here has 15 hammers to the set, each hammer weighing 300 pounds. Rotating at 750 RPM, the hammers are subjected naturally to extremely severe abrasion and impact—edges and corners are soon rounded off, resulting in greatly reduced efficiency and lowered production of properly sized aggregate. Ordinary manganese hammers operated for only one week; *as hard-faced, they now last 10 weeks!* Spare sets are available at all times for installation in the mill while the worn parts are being rebuilt.

Standard procedure now consists of bringing wearing areas back to size with Stoody Nickel Manganese, topped off with a final pass of Stoody 21. As a rule only about 12 to 15 pounds of manganese are required for rebuilding and two pounds of Stoody 21 completes the hard-facing.

Detailed information on maintenance of all types of crushing equipment is contained in the Stoody Guidebook, a copy of which you can obtain from your Stoody dealer (see the yellow pages of your telephone book) or you may write directly to Stoody Company. This famous manual is available without charge, of course.

The hammer in the foreground shows the metal loss in operation: leading edges have been completely worn away.

A hammer rebuilt and hard-faced, ready to be returned to the mill. Hammers can be reclaimed many times and service life prolonged indefinitely.

STOODY COMPANY
11969 East Slauson Avenue
Whittier, California

INTERNATIONAL NEWS

Philippine Survey Proves Iron and Nickel Deposits

One year of exploration for iron and nickel resources on Nonoc Island in the Philippines, conducted jointly by Philippine Bureau of Mines and FOA-PHILCUSA, has proven the existence of more than 6,000,000 tons of lateritic material containing 1.8 percent nickel. Guiding spirits in this work have been Wilford S. Wright, technical advisor of the United States Foreign Operations Administration, and Arsenio Salazar, Philippine Bureau of Mines, who is chief of the party in charge of all field work on the project.

Nonoc Island is roughly 35 square kilometers in area, and more than half of it is covered by a thick mantle of iron and nickel-bearing laterite. Five areas on the island, namely Waterfalls, Conico, Tinago, Marebojoc, and Banlot, have been explored. Laterite covers about 17 square kilometers on Nonoc Island, 6 on Dinagat Island, 7 on Hinatuan Island, and possibly 400 on the Surigao mainland, all within government mineral reservation that was established in 1938. It also covers a large part of Manicani and Homonjon Islands. Exploration of Nonoc Island is 60 percent complete, but the project activities may be extended to include Dinagat and Hinatuan Islands.

The Bureau of Mines and FOA-PHILCUSA hope to establish a reserve of better than 1.5 percent nickel ore large enough to attract private capital for its development.

New South Korean Laws To Induce Foreign Capital

New legislation which would attract foreign investments in its industrial and mining activities is reportedly contemplated by South Korea. The proposed legislation would insure free remittance of profits from Korea to the investor's country, but would also provide that foreign shares be limited to less than half of those in a single firm.

Another administrative measure would eliminate or reduce taxes on capital invested in vital industries, the banking system, and pioneering enterprises, regardless of the sources of the capital. This will contribute to full mobilization of private capital and will be coupled with the opening of a stock market this year, according to Finance Minister Lee Joong-Jai.

In addition, the government will submit to the national assembly a bill covering foreign exchange as another internal measure to attract foreign capital.

The government reportedly also plans to denationalize banks and other enterprises, except such public interest enterprises as electric power, coal industries, and railroads. At present nearly all enterprise is run by state-controlled corporations.

Australia Receives First Gold Subsidy Requests

Applications by the Australian gold mining industry for subsidy assistance are now being received by the Australian Government. The government has divided producers into two groups—those producing 500 ounces of fine gold or more per year, and those with smaller outputs.

The Treasurer, Sir Arthur Fadden, states that before being eligible for subsidy, the value of the gold output from a mine must be more than one half the total value of all the minerals from the mine.

The subsidy to large producers would be based on the formula that for each ounce of fine gold produced in a subsidy year, three quarters of the amount by which the average cost of production an ounce exceeded $30.24 would be paid. Maximum payment would be $4.48 an ounce.

The Treasurer mentioned a number of conditions relating to the subsidy to the large producers. These included receipts for premium sales of gold, a profit limitation test, the rate of recovery of gold, the cost of developing the mines, and the operation by a producer of separate properties.

Small producers will be eligible for payment of subsidy at a flat rate of $3.36 per ounce. The main condition attached to payments to small producers is that the subsidy will be reducible to the extent of any dividend received on account of premium sales.

Newmont Subsidiary Plans Deep Rhodesian Drilling

With a European crew of 17 and 100 native laborers, the Sebungwe Mines and Exploration Company (Pvt.) Ltd. is carrying out a large-scale geological mapping and surveying program, geophysical surveying, and diamond drilling of shallow scout and structure boreholes to 500 feet depth. The area under investigation is in the northwestern part of Southern Rhodesia where the company has options on the claims of the old Copper Queen and Copper King mines, as well as the 100-square-mile area surrounding these claims.

Sebungwe was formed by the Newmont Mining Corporation subsidiaries, Tsumeb Corporation and O'okiep Copper Company. Two Newmont geophysicists from the United States are conducting surface and borehole geophysical surveys using the Newmont "pulse method."

Recently four diamond drills were sent to the Copper Queen by the Newmont group in French Equatorial Africa where the group was investigating several copper deposits located about 125 miles west of Brazaville. Diamond drilling, which is now being carried on by a local contracting firm, will be done by Newmont's own crews in the future. In the second stage of the program which is to be initiated shortly, several 1,000-foot boreholes are planned. Although the ultimate goal is 20,000,000 tons of ore reserves, present drilling is not yet pointed toward blocking out ore.

The ore bodies consist of a series of complex copper-zinc-lead-sulphides, in steeply dipping beds of carbonaceous rocks enveloped in the basement paragneiss series. Major values have been found in zinc.

The company has built an air strip at the Copper Queen mine and has also installed a short wave radio station.

Current field operations are under the direction of J. McCue and J. Claveau, Canadian geologists. Chief consulting engineer and director is E. W. Hunt with headquarters at Tsumeb, South West Africa.

Wormser Heads Office For Minerals Mobilization

The Office of Minerals Mobilization has been established in the United States Department of the Interior to be responsible for adequate supplies of certain metals and minerals and facilities to meet civilian and military requirements. Assistant Secretary of Mineral Resources Felix E. Wormser will supervise the new office; a director will be appointed shortly.

The functions of the new office are many. They include:

(1) Developing, assembling and evaluating data as to the productive capacity and supplies of products from both domestic and foreign sources;

(2) Recommending establishment, or modification of expansion goals, and developing and recommending expansion programs, including advice concerning financial incentives and aids for overcoming shortages of capacity or supply;

(3) Analyzing problems involved in maintaining an adequate mobilization base and recommending necessary action programs including legislation;

(4) Developing, assembling and evaluating data as to materials, equipment, transportation and other requirements of the metals and minerals industries;

(5) As requested by the Office of Defense Mobilization, assembling data on requirements for metals and minerals products as presented by, or obtained on behalf of other Federal agencies;

(6) Formulating necessary foreign mineral exploration and development programs;

(7) Developing and maintaining programs, including the promulgation of the necessary orders and regulations for the operation of the industries and cooperating with the Office of Defense Mobilization, and other agencies in planning other production and distribution controls relating thereto;

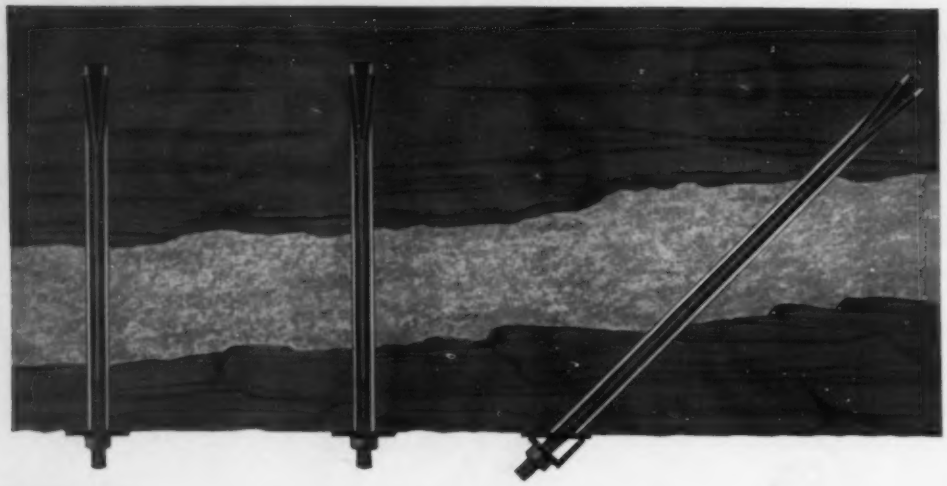
(8) In conjunction with Department of Commerce provides guidance and leadership to the industries in the formulation of plans and programs to insure the continuity of essential production in times of emergency;

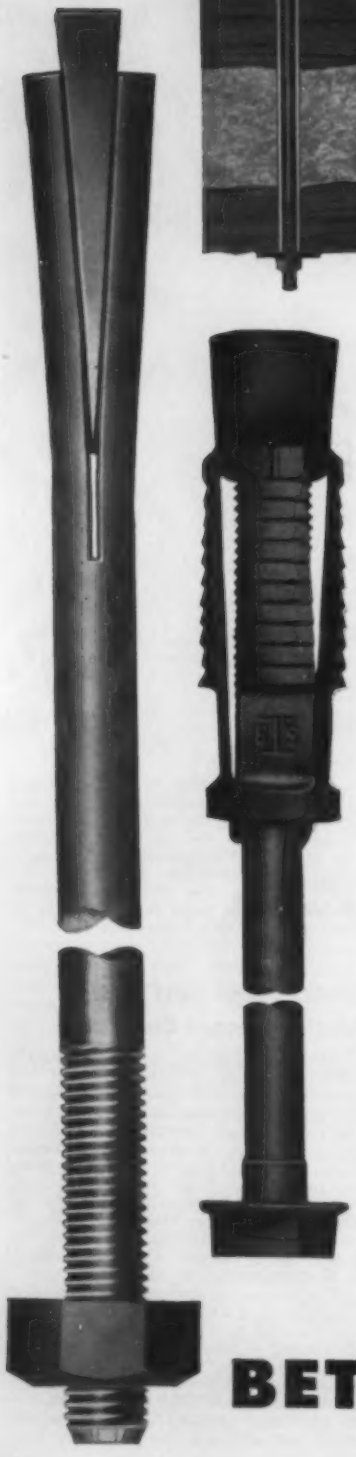
(9) Assisting the Office of Defense Mobilization in plans for stockpiling of strategic and critical materials.

INCO Ships First Nickel Under Recent Contract

The first shipment of approximately 450,000 pounds of refined nickel has been made by the International Nickel Company of Canada, Ltd. from its Copper Cliff, Ontario operation to the United States General Services Administration under a contract signed last fall, providing for refining of certain nickel concentrate produced by Sherritt Gordon Mines Ltd. at Lynn Lake, Manitoba. It represents excess over the quantity needed for processing at Sherritt Gordon's refinery at Fort Saskatchewan, Alberta.

The contract called for delivery of a minimum of 4,500,000 pounds of refined nickel in the period ending August 1955. As a result of improvements in its treatment procedures, Inco will be able to increase deliveries materially beyond the contract minimum. GSA will thus receive an additional quantity of nickel which would not otherwise be available. The





Improved Safety...More Tonnage When You Use Roof Bolts

Safer operating conditions are alone enough to justify roof bolting. A properly bolted roof is a tight, sound roof which greatly reduces the chance of serious roof falls. That's because the bolts consolidate the strata into a single-unit, thick beam.

But in addition mine after mine reports lower costs, faster loading and haulage, from the use of roof bolting. Getting rid of timber supports makes it possible to reduce the width of drifts and haulageways . . . and gives you an equal amount of room to operate equipment. Ventilation is improved, too. It all adds up to bigger tonnage, better profits.

Bethlehem Pacific offers two types of roof bolts. Each has advantages, depending upon local strata conditions. Both are made on the West Coast, from new-billet steel in a variety of lengths.

Let us give you the full story. Just phone or write our nearest sales office. They're listed below.

SLOTTED ROOF BOLT—One end has a slot to accommodate wedge. Other end has 5 in. of 1-in. diam rolled threads. When driven against the back of a 1¼-in. hole, the wedge is forced deep into the slot, expanding the bolt ends so that tremendous pressure is exerted against the sides of hole. American Standard Heavy Hexagon nut is tightened to hold roof plate against the roof.

SQUARE-HEAD ROOF BOLT—The Type C expansion shell fits on the end of a special unchamfered square-head, rolled-thread ¾-in. bolt. When the bolt is driven in place and tightened, the tapered steel plug expands the four leaves of the malleable-iron shell and forces them against the sides of the hole. Minimum breaking load: 20,000 lb.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: Los Angeles, San Francisco, Portland, Seattle, Spokane

BETHLEHEM PACIFIC

BETHLEHEM STEEL

quantity to be supplied will be in addition to Inco's current increased annual production rate of 275,000,000 pounds, and Sherritt Gordon's scheduled production rate of 18,000,000 pounds for 1955.

U.S. Smelting Acquires Livengood Gold Placer

All Alaskan property formerly owned by Livengood Placers, Inc., including the six-cubic-foot Yuba dredge, equipment, and supplies, has been purchased by the United States Smelting Refining and Mining Company. U.S. Smelting was high bidder when the Reconstruction Finance Corporation recently called for bids on the property. Located at Livengood, Alaska, about 80 miles from Fairbanks, the property had last been operated by Callahan Zinc-Lead Comany under an arrangement with the RFC and Livengood Placers.

U.S. Smelting is currently studying the property, but believes that a profitable dredging operation cannot be conducted at present costs and the current price of gold, so the dredge may be moved to another location.

The Alaskan dredging season was somewhat longer last year because of the mild fall weather. At Fairbanks, four of the U.S. Smelting dredges shut down in the latter part of November and one in early December. Dredge No. 5 at Fairbanks completed its dredging program on Little Eldorado Creek in September and has been partially dismantled preparatory to an overland move to Dome Creek this winter. Nome Dredge No. 1 was shut down late in November; Dredge No. 2, a shallow digging boat, completed the ground it is capable of handling in its present location in October, and was set on a shelf for an indefinite period. Repairs to Nome Dredge No. 5 ladder are practically completed and that dredge will be ready for operation at the start of next season. Gold production at Fairbanks, last season, was somewhat higher than in 1953, while that at Nome was lower because Dredge No. 5 was not in operation.

AUSTRIA—The *Ferro-Mangan G.m.b.H.* of Innsbruck in the Tyrol province reportedly plans to mine manganese ore near Stangen at the Arlberg. An aerial tram from that village to the mining site at Dawialpe is planned.

YUGOSLAVIA—At a special meeting of the *Corporation of Mining and Smelting Engineers* at Bor, Serbia, in November, steps were taken to increase copper production by 25,000 tons a year, in addition to an annual output of 575,000 tons of superphosphates. The group discussed problems concerning copper ore mining and dressing, copper smelting, and metal distribution at Bor and Majdanpek. The main problem is that the present copper production of aproximately 30,000 metric tons yearly is lower than the consumption of the two newly erected factories—the rolling mill at Sevojno and the electrical cable plant at Svetozarevo—not counting current consumers. The group made the following recommendations to the government: the 100,000,000-ton Majdanpek ore body should be brought into production as soon as possible by open-pit mining, at the rate of 10,000 tons of 0.9 percent ore per day. The Bor smelters must be reconstructed, with reverberatory furnace smelting recommended as the most suitable method. It was also suggested that sulphuric acid be made from smelter gases at Bor, and the acid transported to Prahovo on the Danube where an artificial fertilizer $(NH_4)_2SO_4$ plant should be erected. The whole project is estimated to cost 30,000,000 Dinars and would take about six years to complete.

BULGARIA—A furnace department to process uranium ore is to be built during 1955 close to the *Buhovo* mine. Two tunnels will funnel the ore to the plant which will be located below surface. Soviet engineers are said to be supervising the construction of the processing plant, just as they are supervising the mining of the uranium ore.

SPAIN—Exploration by *La Alquima S.A.* is said to have revealed the location of sizeable metallurgical-grade bauxite deposits in Catalonia. Reserve is estimated at between 6,000,000 and 7,000,000 tons of 60 percent Al_2O_3. Until now, bauxite occurring in Spain has been lower than metallurgical grade, so this discovery may have important results for the Spanish aluminum industry if the deposits live up to expectations.

CYPRUS—The *Cyprus Sulphur & Copper Company, Ltd.*, a subsidiary of *Esperanza Copper & Sulphur Company, Ltd.*, suffered a setback during the 1953-1954 fiscal year, as compared with the 1952-1953 period, when profits dropped from £122,851 to £65,720. Virtually all of the profit (except for £8,000) was appropriated for amortization of mine development; the remaining £8,000 was transferred to General Reserve so Esperanza received no income for that period. A deficiency in water appears to be holding back production to a certain extent, but the decrease in revenue is chiefly attributed to the drop in trading profit from £145,746 or £5-11-0 per ton during 1952-1953 (for 26,569 tons shipped), to £99,063 or £3-2-0 for shipments totaling 31,750 tons. New contracts have been made in connection with the disposal of ore which are again less favorable than the earlier one.

CZECHOSLOVAKIA — The Soviet Union fulfills 100 percent of the Czech manganese ore requirements, 80 percent of the iron ore, 70 percent of copper ore, and 50 percent of aluminum. In addition, the Soviet Union ships zinc, lead, nickel, tin, ferro-molybdenum, ferro-wolfram, and a number of other alloys to the Czech economy. In turn, the Czechs deliver finished metal goods to the USSR or its satellites.

U.S.S.R.—The Soviet Union, through its official buying agency, Amtorg Trading Corporation, is reported to have offered to trade manganese and chrome ore for butter and some agricultural products from the United States. The Soviet satellites, but not the Union itself, are re-

Crew Sets New British-European Tunneling Record

Driving 428 feet in seven working days, a tunneling crew (pictured above) of the Mitchell Construction Company has achieved a new British and European tunneling record. The record was established in the St. Fillan's section of the North of Scotland Hydro-Electric Board's Breadalbane Project where Mitchell began operations in May 1954. Since tunnel driving started in August, nearly 9,000 feet of tunnel have been driven on six different headings. Using six Atlas RH656-4W lightweight drills in the 10-foot bedwidth Glen Almond tunnel, 18,300 feet of shot holes were drilled and during the seven days a total of 66 rounds were fired and mucked giving an average pull of 6.4 feet per round. The best time recorded for one complete cycle of operations, between firing, was 1 hour 55 minutes. Normally the tunneling crews work a six-day week of two 12-hour shifts. On the third day when the possibility of establishing a record became apparent, it was decided to work through the complete seven days. The tunnel crew were in their 17th week when the record was achieved and had driven 3,300 feet. The Glen Almond tunnel, which is being driven through hard epidiorite rock, will be 17,200 feet in length when completed. It is being driven from two headings—Glen Lednock (outfall) where the record was achieved, and Glen Almond (intake). Work has only recently begun on the Glen Almond heading. Breakthrough is expected early in 1956. The Glen Almond tunnel will lead water from the River Almond to the Glen Lednock reservoir.

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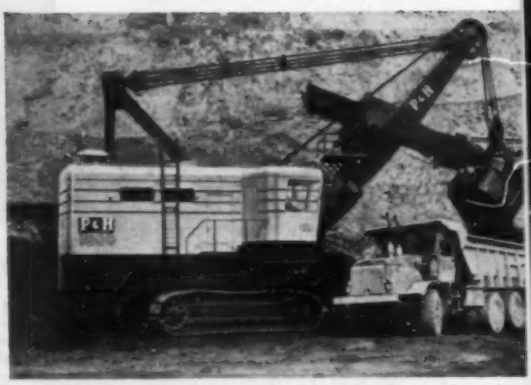

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NORWAY—Imports of manganese ore during the first six months of 1954 totaled 42,989 metric tons, which is less than half of the amount imported during the first six months of 1953—98,521 tons. Norway also imported 7,800 metric tons of nickel-copper matte during this six-month period, compared with 13,995 tons in the corresponding period of 1953. During the first half of 1954, the country exported 164 metric tons of molybdenite, compared with 95 metric tons in the same period of 1953.

POLAND—A new iron ore mine is under development in the Kielce district. First ore is to be mined soon. The *Henryk* mine is expected to yield considerable amounts of ore for the Czestochova iron and steel combine. The first copper ore from the newly opened Boleslawiec shaft, the first entirely new copper mine opened since the end of World War II, began producing in October. This mine is the second copper producing shaft in all of Poland, with the Konradin shaft having started production in 1953. The latter was reopened by the Polish government after 15 years of idleness. Both mines together, are expected to take care of domestic copper ore requirements.

SWEDEN—Ore bodies of high copper content are reported to have been located in the Adak district of north Sweden.

RUMANIA—For the first time in many years, the Rumanian government has released some actual figures instead of percentages of the production plan fulfilled. In the field of steel production, 720,000 metric tons were produced in 1953, or 50 percent more than in 1938. Iron ore mined totaled 450,000 tons, or a 250 percent increase. According to a government statement, heavy industry's output is to be constantly enlarged during the next few years to reach 2,000,000 tons in 1960.

BULGARIA—Considerable increases in production volume during the third quarter of 1954 are reported for Bulgarian heavy industry. Production plans for the heavy industry section were fulfilled by 11 percent above the quota. Of that amount iron ore output was 16 percent above the same period of 1953, manganese ore 83 percent, copper ore 13 percent, lead-zinc ore 22 percent, copper concentrate 164 percent (one new copper processing plant finished early in 1954); lead concentrate was up by 17 percent, and zinc concentrate by 21 percent. Since steel production was not mentioned, it is believed that the output of the only Bulgarian steel mill, the Lenin Combine near Dimotrovo, planned for an output of 80,000 tons of steel in 1954, did not meet this quota.

ITALY—The Ministry of Industry has invited the *Monte Amiata Company*, Italy's largest quicksilver producer, to submit development plans for some inactive concessions. Mining permits can be withdrawn by the government when the proper development does not take place within a certain number of years. The recent world demand for mercury has prompted this action. In November a decree was passed imposing a manufacturing tax on quicksilver of 32,000 lire per flask of 34.5 kilos net weight. A tax of 800 lire per kilo was also imposed on quicksilver ore. Exports of quicksilver in

How New Mexico copper mine speeds tractor work

One Tournatractor clears rock from highway.

The other cleans pit floor around shovel.

WITH mostly rock to handle on a 6-day week, year-round basis, a large open-pit copper mine in New Mexico uses 2 Tournatractors as utility tools.

These rubber-tired tractors clean up around large stripping shovels. They also keep haul roads and highways clear of rock, traveling over pavement without damage. When mixed dirt and rock are encountered, one unit pulls a 20-yard scraper; the other, a Rooter. In spare time, Tournatractors do a wide variety of odd jobs, including stockpiling, unloading supplies, pushing railroad cars, etc.

Their chief advantage for this scattered work is their speed. They can go anywhere — across the pit floor or over pavement — at speeds up to 19 mph. With instant-shift transmission and 8 mph reverse, they work 2 to 3 times faster than crawlers on most pushing and pulling jobs.

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Here is what other pit owners say about TOURNATRACTOR:

Texas Iron Mine — "Where speed, mobility and power are essential, it is the best machine I have ever seen."

Illinois Coal Mine — "There is not a crawler-type machine made that will move the amount of dirt Tournatractor will."

Ohio Cement Plant — "Moves as much shale in ½-day as crawler can in full day — and has saved us moving costs and delays."

Arkansas Bauxite Mine — "Serves us well. Mobility lets it easily handle our large number of scattered small jobs."

Kentucky Coal Mine — "Does about twice the work of a crawler on straight dozing or clearing the coal seam."

LeTourneau-Westinghouse Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

September totaled 7,327 flasks, making a total of 51,449 flasks for the first nine months of the year.

UNITED KINGDOM—It has been decided to form a United Kingdom Metal Mining Association, whose purpose will be to represent the interests of non-ferrous metal mining industry and to form a negotiating channel for presenting the views and problems of the industry to both the central and local governments. It is hoped that this new body will work for home mining in the same way that the British Overseas Mining Association (BOMA) works for British Overseas mining interests. It has also been suggested that the new group cooperate with the Cornish Mining Development Association formed a few years ago to cover metal mining in the western part of England.

FEDERATION OF RHODESIA AND NYASALAND—The first uranium production is expected to start soon in Northern Rhodesia. A copper-uranium ore body will be mined in the Mindola mine section of *Rhokana Corporation, Ltd.* and the ore treated at the corporation's plant at Kitwe. Geological and metallurgical investigations have been carried out for the last two years with reported satisfactory results.

MOZAMBIQUE—Larger cobalt content, up to 1.5 percent in ore, has been found in the *Mt. Chidwa* copper deposit in the Tete district optioned by the *Central Mining & Investment Corporation—Rand Mines Group*. (See MINING WORLD, September 1954, page 86.) The group applied earlier for an exclusive mineral concession covering the wider Mt. Chidwa area; the boundaries of the ground applied for have now been modified since the granting of the Tete concession to A. V. Lillas (See MINING WORLD, November 1954, page 65.) and are now confined to an area between the Mavuzi River in the west and the Lillas Tete boundary on the east. As of late December 1954, the Portuguese government had not yet decided whether to grant the concession area to Central Mining & Investment.

UGANDA—*Rosterman Gold Mines Ltd.* announces that its new venture in Uganda is progressing satisfactorily, although the work done in the past year was really still in the nature of prospecting. Some 48,600 pounds of tungsten were produced and this production continues. The exact pattern of the lodes has proved difficult to follow and the operating company, *Rosterman (Uganda) Limited*, has requested the Uganda Geological Survey to investigate this on their behalf. Decisions on future operations will be governed by this report.

NIGERIA—The Nigerian government has granted a new consolidated lease for 21 years over the Kontagora Lode area to the *Amari Mines Ltd.* The lease requires energetic proving of extensions of the lode in depth and installation of a crushing plant to deal with dumps of residual ore, as and when they consider it expedient. The company believes it now has sufficient evidence of the existence of tantalite and columbite on its properties to justify further development. Preparations for new financing are now being made so that these deposits can be mined.

MOZAMBIQUE—The *Transvaal Ore Company, Ltd.* of Johannesburg is investigating the vermiculite deposits of Panzo at the Zambezi River in the Tete district held by L. A. Schwalbach. Several deposits of good grade vermiculite have been disclosed but it is too early yet to assess their economic importance. The *Transvaal Ore Company* operates the Palabora vermiculite mines in the Union of South Africa. There the vermiculite is associated with the Palabora carbonatite structures carrying also appreciable quantities of apatite. It is expected that the vermiculite output of the Palabora mines will shortly reach the 100,000-ton annual goal.

FRENCH CAMEROONS—*Pechiney* and *Ugine*, the two largest producers of aluminum in France, have established an affiliate, the *Compagnie Camcrounaise de l'Aluminum Pechiney-Ugine, (Alucam)*. The new firm will build a plant at Edea in the French Cameroons with a capacity of 45,000 to 50,000 annual tons. Operation is scheduled to begin in 1956 and it is expected that full capacity operation will be possible in 1958. Pechiney and Ugine have subscribed 80 percent of the capital, the Caisse Centrale de la France d'Outremer (State Bank for Overseas Territories) and the Cameroons the remainder. Total cost of the plant is expected to be about 16,000,000 metropolitan francs.

UNION OF SOUTH AFRICA—Rich deposits of titanium, in the form of the mineral ilmenite, have been discovered in government ground on the coast of Namaqualand. It is reported that a company will be formed to work the deposit.

FEDERATION OF RHODESIA AND NYASALAND—The *London & Rhodesian Mining and Land Company, Ltd.*, Southern Rhodesia's leading gold group, is investigating and developing under option the *Bohera* and *Corundum Blue* claims owned by D. H. Cawood, about 40 miles from Bohera. The claims contain a fairly large pegmatite carrying tantalite in lepidolite-greisen, and in perthite zones near the quartz core. Free tantalite is also found in extensive eluvial rubble layers. The owner produced spasmodically smaller quantities of tantalite with a three-stamp mill. The company is at the present time investigating the lead occurrences in the claims area.

GOLD COAST—An option granted last August by *Offin River Estates Ltd.* to a South African diamond firm reportedly will be exercised. The option covered Area No. 22 and provided for purchase outright of the company's diamond deposits. Area No. 22 is 20 square miles. In addition, the optionee has the right to prospect for and work any deposits of diamonds in the remaining Areas Nos. 21, 23, and 28.

MOZAMBIQUE—*American Abrasives (Pty) S.A., Ltd.*, South Africa's largest producer of crystalline corundum, in conjunction with the *British Metals Corporation Ltd.* will prefinance corundum production to be carried out by a local Mozambique syndicate on the recently discovered corundum deposits at Vila Pery. Several potential corundum-bearing pegmatites have been recently discovered and proved to carry up to five percent of crystalline corundum. Extraction will be facilitated because of complete kaolinization of the remaining pegmatite matrix in the closing stages of mineralization. The extensive eluvial layers will also be treated by gravity concentration. The extensive deposits are situated at the Lower Revue River close to the boundary of the recently granted concession area of Inchope to A. V. Lillas. The initial production of approximately 50 tons per month is to be gradually increased to 100 tons monthly. The entire output is to be exported to the United States.

How Kyanite Is Mined in Nyasaland

Pictured above is the kyanite ($Al_2O_3 \cdot SiO_2$) development project of the General Refractories Ltd. at N'cheu, Nyasaland. The natives can be seen loading broken kyanite on one of a series of benches developed at the open pit. The large massive kyanite lenses are being quarried for shipment to the Sheffield steel works in England where they are used in the manufacture of refractories. Last year, General Refractories undertook an extensive geologic survey and diamond drilling of the deposits prior to mining. Production has been at the rate of about 200 tons of crude massive ore weekly.

INTERNATIONAL

EGYPT—The Mining and Petroleum Committee of the National Production Council is reported to be drafting a new mining law which is meant to encourage mineral prospecting in the Egyptian deserts. Under the proposed legislation, individuals and organizations are entitled to carry out prospecting work and to develop mines and quarries through the issuance of prospecting permits and development concessions by the Minister of Commerce and Industry upon the recommendation of the Mines and Quarries Department. In addition to supervising mine and quarry development, and exercising control over them with regard to industrialization, storage, and transportation, the Ministry of Commerce and Industry would also have the right to prospect for minerals and develop projects either directly or by turning the work over to some one else. Preference will be given to Egyptian residents in all mining permits. Foreigners receiving permits must live in Egypt and keep all account books and other relevant documents in Egypt. Royalty is fixed at 20 percent for precious stones and similar minerals, and five percent for other minerals. The minister has the right to reduce the royalty on recommendation of a special technical committee appointed for the purpose. The draft law still has to be approved by the Egyptian Council of Ministers before it becomes law.

FEDERATION OF RHODESIA AND NYASALAND—*Bancroft Mines Ltd.* expects to go into full production of 4,000 short tons of copper monthly by 1957, instead of the original estimate of 1958. This speeding up program has made additional financing necessary and arrangements have been made for Bancroft to issue £3,000,000 5 percent notes either to *Rhokana Corporation*, which subscribed for nearly 48 percent of Bancroft's shares, or to nominees of Rhokana. The areas under development are the Konkola and Kirila Bomwe ore bodies in Northern Rhodesia.

SOUTHWEST AFRICA—The *Industrial Diamonds of South Africa* (1945) *Ltd.* hopes to initiate production from the gravels of the recently discovered marine terrace at Saddle Hill North in the Luderitz district shortly. The terrace has so far been proved diamondiferous over a length of 300 yards.

NIGERIA—Ore reserves at the *Ameri* and *Nyeba* areas of *Mines Development Syndicate (West Africa) Ltd.* are estimated at between 900,000 and 1,000,000 tons containing 10 percent lead and 7.3 percent zinc. This has been indicated by diamond drilling. The management has decided to mine and treat the ore on the basis of 250 tons daily.

BELGIAN CONGO—*Union Miniere du Haut Katanga*, which owns and operates the *Shinkelobwe* uranium mine, has become the first company outside the United States to join the *Atomic Industrial Forum, Inc.*—the United States industrial association devoted to advancement of peacetime developments of atomic energy. The Shinkelobwe mine was the principal source for uranium during the World War II United States atomic energy program and has remained a primary source ever since. The Forum recently opened its membership to non-United States affiliates and the Union Miniere was the first organization affiliate, while Alexander Wust, director general of Societe d'Electricite de l'Escaut in

Antwerp, Belgium, became the first individual affiliate.

KOREA—The 250 tons of Korean tungsten placed on the open market for the highest January bid are reported to have gone to *Wah Chang Corporation* of New York. Ten bids were received—two in London, seven in New York, and one in Seoul—with Wah Chang offering $26.00 per long ton unit for 200 tons of 65 percent grey ore (powellite), and $25.00 for 50 tons of 60 percent black ore. The South Korean government plans to hold further international bidding after a second 250 ton sale on February 10th.

JAPAN—The *Japan Light Metal Company* has announced that it will supply 20,000 tons of alumina to the *Aluminum Company of Canada's* Kitimat operation in British Columbia this year. The Japanese firm plans to import an additional 40,000 tons of bauxite from Malaya this year for use in the production of the alumina.

BURMA—The Burma Government *Mineral Resources Development Corporation* reports that large manganese deposits have been found in the Hopong state, 12 miles due east of Taunggyi, southern Shan states. First opened in 1952, some 20,000 tons of manganese have been exported to the United States, United Kingdom, and other countries in Europe. A 250-foot shaft has been sunk on the deposit. Further geological and geophysical prospecting are being carried out and indicate that the manganese and iron deposits are widespread and valuable.

INDIA—The government has reviewed the policy for the export of manganese and iron ores in the light of available rail transport capacity and the conditions in the international market. Movement of ore in the port of Calcutta will continue to be relegated on a quota basis. Newcomers who are not quota holders may also apply to the Joint Chief Controller of Imports and Exports at Calcutta with evidence of business on hand. Such applications will be considered in light of rail transport capacity available at that time. Supplementary allotments will be given to shippers and mine owners of manganese or iron ore who use up their basic quotas and have firm contracts for additional business on hand. These applications will be considered on merit in the light of rail cars available at the time.

MALAYA—At Gakak Creek, *Pahang Consolidated Company, Ltd.* sank two drill holes which showed that a strong tin-bearing lode continued at depth. However, the results were not entirely satisfactory and two more holes are to be drilled. If these results are favorable, equipment and development of the mine will be undertaken as quickly as security position will permit.

TURKEY—Tungsten deposits discovered on the Ulu-Dag near Brussa will be worked by the *Eti Bank*. Content of the deposit averages about 0.5 and in some places 1.0 percent.

JAPAN—A 250-ton-per-day mill has been completed by the *Sumitomo Metal Mining Company* to treat copper ore from the *Yaso* mine located in Fukushima prefecture. The mine was once explored by the *Nippon Mining Company*, and then its successor, *Nichiman Mining Company*, just before World War II. After the war, Sumitomo purchased the property and continued to mine pyrite ore while seeking copper. Finally, a copper deposit was found and recoverable ore reserves confirmed, so pyrite mining ceased while the copper development moved forward.

TURKEY—Chrome ore shipments from Aegean ports in 1954 declined from 240,000 tons in 1953 to 120,000 tons in 1954. Turkish authorities are considering a reduction in domestic freight charges and the export tax on chrome ore as ways of increasing shipments.

MALAYA—Another mining company is expected to start mining columbite in the Bakri area of Muar, Johore. Three mines are now in operation there and together they are producing more than 400 piculs of mixed columbite and tin ore per month. Between 30 and 40 percent of the mixture is columbite. Pioneers in the district once mistook columbite for low grade tin and abandoned the ore. A high percentage of the alluvial deposits of tin were in fact columbite which had no commercial value at that time.

INDIA—Most of the machinery for a silver refinery to be set up in India has already been received from the German firm of *Messrs. Demag Electro-Metallurgic*.

BURMA—There is no improvement in the lawless condition prevalent in the Tavoy mining district. Burmese mine owners dare not visit their mines, and qualified engineers are restricted to Tavoy municipal limits. Mine labor virtually controls the mines and disposal of mineral output. A high forced levy must be paid to the terrorists. No development is being done on the mines and workings are gradually being silted up with tailings. Consequently mineral output is declining. Production and export figures for the Tavoy district during the first six months of 1952, 1953, and 1954 are compared below:

MINERAL PRODUCTION (IN TONS)

Production	*1954*	*1953*	*1952*
Tungsten concentrate	107.80	251.80	160.20
Mixed (tin and tungsten)	460.10	881.00	691.50
Tin concentrate	116.20	83.30	27.10
Total in tons	684.10	1216.10	878.80

MINERAL EXPORTS (IN TONS)

Production	*1954*	*1953*	*1952*
Tungsten concentrate	693.70	958.05	774.60
Mixed concentrate		242.85	209.40
Tin concentrate	306.45	193.20	152.00
Total in tons	1000.15	1394.10	1136.00

Shipments of tungsten to the United States in the first six months of 1954 were 274 long tons.

IRAQ—The *Texas Gulf Sulphur Company* is again engaged in talks with the government regarding the question of developing sulphur deposits in the country. Last year an apparent deadlock was reached and it seemed as if the company had lost interest, but negotiations have been reopened. It is rumored that the government demanded 60 percent of the royalties which was unacceptable to the company.

MALAYA—*Malayan Tin Dredging Ltd.* expects to resume dredging of the old river bed after diversion of the Kinta River is completed early this year. The Batu Gajah No. 6 dredge was benched in the beginning of 1954 pending completion of the Kinta and Pinji River diversion. Since then the dredge has been undergoing a thorough overhaul in order to fit it for dredging the balance of the old bed of the Kinta River. This latter project is expected to take six years.

During the year ended June 30, 1954, the new mechanical ore dressing plant at Kampong Gajah operated successfully resulting in lower costs and better recovery. With the addition of electrostatic separators, recovery of tin will be further improved and a marketable grade of monazite concentrate will be produced as well.

INDONESIA—Tin production during October set a post-war record for Indonesia. The output was equivalent to 3,562 tons of tin metal. Tin concentrate exported during the month, including slag, amounted to 5,621 tons valued at 86,281,000 rupees.

PHILIPPINE ISLANDS—*Mindanao Mother Lode Mines* is undertaking the further development of a copper property in Zambales by underground exploration after results of diamond drilling appeared to justify further work on the property. The company has an option from the *Cabapa Mining Company* to prospect its 118 lode mining claims situated in the municipalities of Botolan and Cabangan, Zambales.

WESTERN AUSTRALIA—Private prospecting parties have found uranium in the Hall's Creek-Wyndham area. An 18,000-square-mile survey made by the Bureau of Mineral Resources last year indicated 54 well-defined points of radioactivity and many smaller points, most of them within an area centered about 30 miles north of Hall's Creek. A number of claims lodged at Hall's Creek include applications by *Rio Tinto Ltd.* of London. The wet season may delay examination of the various prospects.

NEW GUINEA—During the six-month period ended November 30, 1954, *Bulolo Gold Dredging, Ltd.* dredged 8,046,450 cubic yards to recover 30,532 ounces fine gold. This is a decrease when compared with the same period of 1953 when 6,431,850 cubic yards were dredged to recover 36,784 ounces fine gold. The company's dredging reserves have been recalculated upon recent drilling results and revision of dredge courses. Accordingly, the total reserves for future operations are estimated at 49,133,500 cubic yards, comprising 40,734,500 cubic yards of dredgable gravel having an estimated value of 17.4 cents per cubic yard, and 8,399,000 cubic yards having an estimated value of 16.8 cents per cubic yard which will be handled hydraulically.

QUEENSLAND—*Mount Isa Mines, Ltd.* has options on four uranium leases 25 miles south of Duchess. These are *First Try Nos. 1 and 2* and *Mother's Hope Nos. 1 and 2*. The company has also applied for the *Mount Isa Extended* lease of 640 acres at the north of the present boundary. This area was formerly held under Authority to Prospect but was abandoned.

PHILIPPINE ISLANDS—*General Base Metals, Inc.*, the country's largest manganese producer, has concluded price and barter agreements with its ore buyers for the year, and shipments have started. Negotiations have been concluded on a 25,000-ton contract and the company looks forward to a good year in 1955.

WESTERN AUSTRALIA—A deposit of flake graphite has been prospected at Munglinup where other deposits have been known for some years. Ore may be cheaply mined by bulldozer and flotation tests yielded a concentrate 84.5 percent carbon. *Australian Graphite, Inc.* has been formed to develop the deposit, and a mill will be erected.

PHILIPPINE ISLANDS—The Philippine government is considering the construction of a large pig iron smelting plant at Iligan, Lanao, to strengthen the foundation of the nation's industrialization program. A proposal for such a plant is said to have been submitted to President Magsaysay by the *National Shipyards and Steel Corporation*. This would be the second phase of an administration plan for a basic iron and steel industry. The first phase is the construction of a plant to process the piles of scrap iron accumulated during World War II. Com-

pletion of this smaller project at Iligan is expected shortly.

QUEENSLAND—*Mount Isa Mines Ltd.* at Mount Isa, Queensland, is investigating the possibility of establishing a zinc smelter at Bowen where it owns the *Bowen Consolidated Coal Mines.* The smelter would probably be capable of treating at least 50,000 tons of concentrate per year. In addition to producing approximately this quantity of concentrate, Mount Isa Mines has a large dump of granulated slag running about 14 percent Zn which may be a source of zinc fume at a later date. The company's copper output has been temporarily restricted because of smelter repairs.

WESTERN AUSTRALIA—*Shaw River Alluvials N.L.* has purchased tin leases known as the Rhodes areas, east of Black Range, near Shaw River. Recoveries from these are reported to be about four pounds per yard, despite heavy tailing losses caused by use of primitive equipment. If the natural disadvantages of work in such an area can be overcome, the company should do well from its planned throughput of 2,000 yards per day. Equipment so far acquired includes bulldozers, Diesel dump trucks, and a 1¾ yard shovel. Total yardage covered by these leases is about 10,000,000 to 12,000,000 cubic yards.

INDONESIA—The Geological Department of the government has placed an order for two gas-driven diamond core drills with E. J. Longyear Company in the United States on the advice of geologist A. Kraeff, employed by the department. It is interesting to know that Professor Fermin of the A.I.M.E. who has worked in this country for 30 years, is pessimistic about using diamond drills. Drilling in the tropics often means alternating soft and hard resistance, due to intensive weathering. A.I.M.E. had bad experiences with diamond drills before World War II. However, Professor Kraeff thinks success with diamond bits is principally dependent upon well skilled drillmen. Practice will show who is right.

NORTHERN TERRITORY—*Uranium Development and Prospecting N.L.* has been granted an authority to prospect over 195 square miles of the Goodparla area 60 miles east of Pine Creek. This embraces the so-called South Alligator Fault. The company is progressing well at Adelaide River and has made shipments of good ore to Rum Jungle—65 tons averaged 1.76 percent uranium oxide and were valued at £A71 per ton. A number of shafts have been sunk at Adelaide River. In No. 5 of these, a crosscut intersected a lode on the 111-foot level. High-grade ore containing torbernite and probable pitchblende was exposed.

QUEENSLAND—The state government will undertake aerial surveys of areas likely to contain radioactive minerals. Work has started near Cloncurry and will also cover Mt. Isa, Pentland, Herberton, Forsayth, and Georgetown. The principal leases in the Cloncurry-Mt. Isa area have been examined by staff members of the Atomic Energy Commission and Commonwealth Scientific and Industrial Research Organization with a view to assessing potentialities for a uranium treatment plant.

LATIN AMERICA

COLOMBIA—*Asnazu Gold Dredging, Ltd.* has estimated that No. 1 dredge will have worked out its reserves and will be closed down by January 1956, and consideration is being given to disposal of surplus plant, buildings, and equipment. Dredge No. 2 was closed down in April 1954, with the Ovejas hydroelectric plant and camp buildings at Vidal becoming surplus equipment not needed for dredge No. 1. While a purchaser for No. 2 dredge has still not been found, the management has sold the plant and transmission system for 380,000 pesos and the buildings at Vidal camp for 69,500 pesos. (Total: $179,800.)

CHILE—France has released credits for the purchase of Chilean copper in the first six months of 1955. The copper is from the small mines where France has financial interest. The larger mines demand dollar payment, and the French government does not grant dollars for copper imports from Chile. Tonnage will probably be less than 3,500 tons.

MEXICO—The Sonora government is checking reports by gambusinos of the discovery of an important gold-silver-lead deposit in a "ready made" transportation zone—close to a railroad, near Estacion de Cabullona 15 miles south of Agua Prieta.

Ore samples are being assayed at the state's metals and minerals laboratory in Hermosillo, the capital of Sonora.

BRAZIL—A new occurrence of radioactive mineral was recently registered in Massaranduba, Guaramirim district, state of Santa Catarina. The radioactive mineral thorite, found in pegmatites intruded in granitic rock, was discovered by Dr. H. Putzer, geologist with the Departamento Nacional da Producao Mineral. Systematic surveys of Brazil's territory are under way aimed at discovering further sources of nuclear minerals. Up-to-date scintillometer and magnetometer methods are being used. The rich uranium-bearing beds already discovered and surveyed at Pocos de Caldas are expected to be developed for large-scale mining.

PERU—Colonel Jorge Sarmiento, president of the Board of Control of Radioactive Substances in Peru, recently reviewed the work being done to disseminate information which will assist mining entities and prospectors in search of uranium deposits. He reported that in the Vilcabamba region of the department of Cuzco, samples of uranium ore which had been analyzed in the United States assayed as high as 1.8 percent uranium oxide. Maps indicating the regions favorable for the existence of uranium in Peru are now being released to the public.

CUBA—A $6,000,000 appropriation has been made to the National Executive Commission of Agricultural and Mining Cooperatives (CENCAM). The Commission was recently established to help develop Cuba's mining and agricultural industries. The money will come from funds raised for the government's overall Social and Economic Development Plan.

MEXICO—The initial shipment of processed sulphur from *Texas International Sulphur Company's* autoclave plant near San Felipe, Baja California, has been made under terms of an agreement by which Texas International subsidiary *Azufre S.A.* will sell the entire output of its plant to a Mexicali insecticide manufacturer. The latter will get about 7,000 tons a year which is the anticipated annual output of the San Felipe plant. The material was trucked 150 miles from San Felipe to Mexicali.

ARGENTINA—Columbite and tantalite are obtained as accessory minerals from pegmatites in Argentina. The grade assays up to 72.4 percent T_2O_5 and 72 percent Cb_2O_5. Tantalite and columbite development is largely in the zone of El Quemado (Salta Province) where deposits have produced up to one ton each. The national output is about five tons annually, and this is not treated in the country but exported. There are no ore reserve figures but the situation is considered promising.

BRAZIL—The government is currently studying the possibility of setting up a steel plant in the federal territory of Amapa. According to representatives of the *Hanna Exploration Company*, the *Santa Maria* iron ore deposits in the territory have a reserve of 10,000,000 metric tons of compact hematite and more than 100,000,000 metric tons of secondary ore. According to the same group, the Santa Maria ore can be easily exported because of its quality. The territory of Amapa possesses huge deposits of manganese ore as well.

PERU—*Cerro de Pasco Corporation* has completed diamond and churn drilling of its *Cuajone* porphyry copper ore body which has been under way since early in 1953. Development and bringing to the production stage are dependent upon the future copper market.

MEXICO—The *Compania Metalera de Sonora* is reported to have applied to the United States General Services Administration for another four-year contract. The company is completing its first four-year contract in 2¾ years because of the installation of a new manganese mill at Agua Prieta.

ALASKA—The DeCoursey Mountain Mining Company has sold its mercury properties 250 miles west of Anchorage to *Brewis Red Lake Mines Ltd.* of Toronto, Ontario, Canada. DeCoursey stockholders will receive stock in a new company, *DeCoursey-Brewis Minerals*. Brewis has recommended to its stockholders reorganization of the firm on the basis of one new share for each eight old ones. The DeCoursey property involves two mines, the *Red Devil* being the principal producer. It has been opened by an inclined shaft with three levels to a depth of 165 feet. The main zone has been traced for a length of 10,500 feet but less than 1,000 feet have been explored underground. Three ore shoots have been revealed, two of which were mined by DeCoursey until a portion of the surface plant was destroyed by fire last October. Immediate plans call for stripping the entire zone on the surface, rebuilding the headframe, and resuming underground exploration. First underground work will be to sink a winze to develop three new levels below the third level. If results are satisfactory, the winze would eventually be raised through to surface to make another production shaft. Other lateral and drifting work is also planned with the total program to cost about $637,000. Work will be done on the second property later in the spring.

ALBERTA—*Sherritt Gordon Mines'* new refinery at Fort Saskatchewan operated at 90 percent of its rated capacity in December, turning out 641 tons of nickel metal. The refinery has been operating on a gradually increasing scale; further improvements and additions to be made during the next six months are expected to bring the plant into full operation. An average of about 2,000,000 pounds of nickel concentrate per month was produced at the company's *Lynn Lake* mine in Manitoba during the last quarter of 1954. Nickel content of the concentrate shipped from Lynn Lake to the refinery was a little over 1,100,000 pounds a month.

BRITISH COLUMBIA—*Craigmont Mines, Ltd.* has located 64 claims adjacent to its eight-claim *Titan Queen* group 15 miles northwest of Merritt and has

Preparations for Gypsum Mining in Nova Scotia

Excavation at National Gypsum Company's new gypsum quarry near Halifax, Nova Scotia, has reached the quarry floor 80 feet below the surface of the ground. The primary crusher will be located in the quarry floor, and from this the rock will go by conveyor belt to a secondary crusher on the surface; then by conveyor belt to a 10,000-ton surge stockpile, and on to the car loader. The gypsum deposit at the quarry site is 300 feet deep, and lies beneath 8 to 40 feet of overburden. The first block scheduled for quarrying measures 2,000 by 3,000 feet and will be mined to a depth of 70 feet. This particular block was selected by company geologists because it offers the highest quality gypsum with the least overburden. The first block is expected to furnish a 30-year supply. Working in the same area, the company reports that it could go on to four succeeding levels each 70 feet deep without running out of rock. National Gypsum's $6,000,000 project, started last summer and expected to be completed in the spring, includes the quarry and rail facilities at Milford, Nova Scotia; dock and loading facilities at Dartmouth, across the Bay from Halifax; and a 30-mile rail spur between. The deposits, discovered by company geologists, will supply the firm's four eastern seaboard gypsum plants at Portsmouth, New Hampshire, New York City, Baltimore, and Savannah. Capacity of these plants has been expanded 25 percent to absorb the additional supplies. The Halifax development will be a year around operation.

acquired other properties giving it approximately 3,900 acres in the area. L. L. Wartes, consulting mining engineer, has advised the management that surface indications and geology point to possibility of a large low-grade copper deposit or several deposits suitable for open pit or glory hole mining, with subordinate amounts of gold, silver, molybdenum, and tungsten.

ONTARIO—*Coballoy Mines Ltd.* has reopened the *Trinova* silver mine in Cobalt, abandoned since 1920, and it is now reported to be producing 1,500 pounds of cobalt, 200 ounces of silver, and 750 pounds of nickel a day. The Colonial mill has been purchased and modernized, and it is now treating about 30,000 tons of rejected ore from a huge pit.

WASHINGTON—The Seattle Assay office opened in 1898 will be closed this month for economy reasons. It formerly handled large amounts of Alaskan gold but this has dwindled to only about three deposits per day. About $80,000 will be saved by requiring the gold deposits to be made in other cities.

BRITISH COLUMBIA—*Cariboo Gold Quartz Mining Company Ltd.* has reduced the cost of producing gold at its Wells property and is now showing a small net profit before government bonus. This is being accomplished by improved mining technique which is yielding increased gold recovery from approximately the same tonnage. Dr. W. B. Burnett is president.

MASSACHUSETTS—The *American Metal Company Ltd.* has become the sales agent for copper produced by the *White Pine Copper Company*, a subsidiary of *Copper Range Company* of Boston. The first copper from this new project was poured in January.

QUEBEC—*Quebec Lithium Corporation* reports the presence of a 25 percent content of aluminum silicate in the ore deposit near La Corne township, north of Val d'Or. The Quebec Lithium property is currently being developed for spodumene production which will be shipped to the two chemical plants of *Lithium Corporation of America* under a five-year contract. It has been hinted that it might be possible to process the aluminum silicate into material for aluminum smelting and reportedly this is being done at an electrolytic pilot plant of *Reynolds Aluminum* in North Carolina.

BRITISH COLUMBIA—*Bralorne Mines Ltd.* in the Bridge River district is deepening its Queen shaft to the 33rd level because of favorable results at the 28th. Additional ore was developed on both the "77" and "79" veins at that level. Work on the 28th and 26th levels also encountered ore. Production for 1954 totaled 65,222 ounces of gold from 181,494 dry tons milled.

ALASKA—A diamond drill crew equipped with a Longyear Wolverine diamond drill with an electric drive and a gas-driven 20-kw generator to furnish the power, are now hard at work on *Admiralty-Alaska Mining Company's* nickel-copper ore body at Funter Bay. Prospect drifting is also continuing.

SASKATCHEWAN—*Wildnest Mines Ltd.* reports that a drill has been flown in for an early start on the investigation of copper, zinc, silver, and gold discoveries on its property 25 miles northwest of Flin Flon. Testing is to be done under the supervision of *Rio Canadian Exploration*, a subsidiary of *Rio Tinto Company, Ltd.* which is financing the operation.

BRITISH COLUMBIA—*Granby Consolidated Mining, Smelting and Power Company* has arranged for sale of copper from its *Copper Mountain* mine for the first seven months of 1955 at current market prices or better. The firm's 30-cent-per-pound sales contract with the United States General Services Administration terminated December 31, 1954, but refined metal under the contract deliverable at this price will continue through April of this year.

ALASKA—Norman Suckling of Manley Hot Springs is drift mining on his property during the winter. He hopes to get underground work completed in preparation for the spring thaw.

BRITISH COLUMBIA—*Cassiar Asbestos Corporation* is planning a $1,000,000 aerial tramway to eliminate three-way handling of ore at its open-pit asbestos mine near Cassiar, 60 miles south of the Yukon border. Ore stripped at the 6,000-foot level is bulldozed into a steel chute nearly half a mile long, fed into ore bins, and trucked 3¾ miles to the bottom of the mill chute. More than 40,000 tons of ore were mined during the 1954 season. A new 300-mile road eventually will reduce mining costs. Asbestos fibers now are trucked to Whitehorse, then freighted to Skagway, and shipped south to Vancouver.

NEWFOUNDLAND—*Dominion Wabana Ore Ltd.*, a subsidiary of *Dominion Steel & Coal Corporation*, will install a large two-section heavy media palnt at its Bell Island property near Newfoundland for operation by July of this year.

Cyclone Plant

(Continued from page 50

This new media is discharged onto both the sink and float tramp screens and thence into the two thickeners. Pumping the new media over the tramp screens serves to act as a safeguard in the event any tramp or oversize material is inadvertently washed in with the media.

The cyclone concentrate produced assayed (dried) from 56 to 59 percent iron and 11 to 14 percent silica over the 1954 operating season; cyclone reject assayed (natural) from 25 to 35 percent iron and 50 to 60 percent silica.

Plant Control

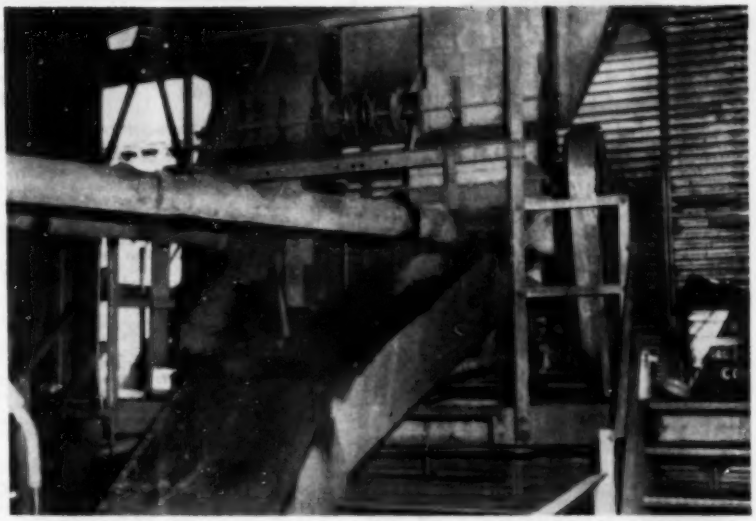
Several methods of control are used to aid in maintaining an acceptable grade of concentrate. They are:

1. Visual inspection of the cyclone underflow; when operating under optimum conditions, this underflow should appear as a fluid spray in the shape of an inverted cone when related to the "cone" of the cyclone itself. A thick "roping" discharge indicates the cyclone is being overfed or that the separating gravity is not high enough.
2. Washing and visual inspection of the cyclone concentrate and reject to examine for quantity of misplaced material.
3. Use of heavy liquid tests on cyclone feed samples to determine concentrating characteristics of the feed and optimum separating gravity to be used.
4. Taking specific gravity readings of the feed media to the cyclones every half hour or oftener to test for fluctuations in this media.

Flowsheet Changes

The Hill-Trumbull cyclone plant started operation in the spring of 1953. Originally each circuit had but one 15-inch diameter cone. Before the start of the 1954 season, another cone of the same size was added to each circuit to provide additional capacity and to improve the metallurgy.

As originally laid out, the reject oversize along with a portion of the drain media was sent to the primary float separators. Water sprays were soon installed near the discharge end of each float screen to wash as much of the attached media from this material as possible, thereby permitting this product to be by-passed to the secondary separator. This procedure



ROLL FEEDERS with adjustable gates deliver the ore from two, 100-ton surge bins to pumps which feed the cyclones. Feed to the cyclone plant is minus-¾-inch, plus-65-mesh material from the washing plant.

aided greatly in producing a much cleaner magnetic concentrate from the two primary float separators.

During the entire 1953 season, both the finished concentrate and reject were pumped to the respective dewatering classifiers which were elevated above separate loading pockets outside of the plant. This practice was not successful and constituted a serious bottleneck in attaining capacity production for the whole season. In addition pump wear was extreme, resulting in much costly delay and repair time. During the winter repair season of 1953-1954, these classifiers were set up in the cyclone plant basement, so that they could receive the products for dewatering by gravity. New 24-inch conveyors were then installed to transport the dewatered concentrate and reject to the respective loading pockets. This system functioned without incident during the past season.

Future Flowsheet Changes

For the 1955 operating season, alteration of the sink drain screens is planned in the same manner as that done to the float drain screens. Sprays will be installed to permit by-passing the washed concentrate oversize to the secondary separators. This should insure a much cleaner magnetic concentrate from the primary unit.

It is planned to increase the magnetic separator capacity as a whole, in order to further clean the magnetic concentrates as well as to aid in reducing the loss of magnetics.

Still more cyclones are planned in order to increase the capacity to the plant and to further improve the metallurgy.

Operating Cyclone Plants on the Mesabi Range, Minnesota

Plant	*Location*	*Company*	*Year plant began production*
Buckeye	Coleraine	The M.A. Hanna Company	1951
Hill-Trumbull	Calumet	The Mesaba-Cliffs Mining Company (The Cleveland-Cliffs Iron Co., Operator)	1953
Hawkins	Nashwauk	The Cleveland-Cliffs Iron Company	1953
Hill Annex	Calumet	Jones & Laughlin Steel Corporation	1953
Harrison	Cooley	The M.A. Hanna Company	1953
West Hill	Grand Rapids	Western Mining Company (Pickands Mather & Co., operating agents)	1954

Cyclone Plants on the Mesabi Range Under Construction 1 January 1955

Plant	*Location*	*Company*	*Year plant is scheduled to begin production*
Tioga No. 2	Grand Rapids	Western Mining Company (Pickands Mather & Co., operating agents)	1955
Bennett	Keewatin	Bennett Mining Company (Pickands Mather & Co., operating agents)	1955
Gross Marble	Marble	Oliver Iron Mining Division (subsidiary of the U. S. Steel Corporation)	1956

U.S.A. Metal & Mineral Prices

METALS

February 15, 1955

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	33.00¢
	Lake. Delivered, destinations, U.S.A.	33.00¢
	Foreign Copper. Valley basis	33.00¢
LEAD:	**Common Grade.** New York	15.00¢
ZINC:	**Tri-State Concentrates,** jig, flotation 80% lead, per ton	$187.50
	Prime Western; F.o.b. E. St. Louis	11.50¢
	Prime Western; Delivered, New York	12.00¢
	Tri-State Concentrate, 60% zinc, per ton	$68.00
ALUMINUM:	**Primary 30 Pound Ingots (99% plus).** F.o.b. shipping points	23.20¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	29.00¢
BISMUTH:	(In ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$1.70
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
COLUMBIUM:	**Powder** Nom., per pound	$75.00
LITHIUM:	98% (per pound)	$10.00-$13.00
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.75¢
MERCURY:	**Flasks.** Small lots, New York	$322.00-$324.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery, Port Calbourne, Ontario	64.50¢
TIN:	**Grade A. Brands.** New York (Price per pound) Prompt delivery	91.25¢
TITANIUM:	**99.3%** + Grade "A" (Price per pound)	$4.50
GOLD:	United States Treasury Price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harmon	85.25¢ per ounce
PLATINUM:	**Per Ounce**	$78.00-$80.00
ZIRCONIUM:	**Sponge, Per Pound**	$10.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado	$47.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$45.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$31.00-$32.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$46.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, jumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.90
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$10.05
	Old Range Non Bessemer. Second quarter	$10.15
	Old Range Bessemer. Second quarter	$10.30
	Swedish, Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit	22.00¢
MANGANESE ORE:	**Metallurgical grade.** 48 to 50% Mn. Long ton unit	$0.90
	Metallurgical grade. 46 to 48% Mn. Long ton unit	$0.80-$0.85
	Metallurgical grade. 45 to 46% Mn. Long ton unit	$0.70
	Chemical grade. 80% MnO_2. Per Ton	$70.00
	Domestic U. S. Government are purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treating costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2 F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.05
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$63.00-$65.00
	Foreign. 65% WO_3 Per short ton unit (Scheelite)	$32.00
	Foreign. South American, Spanish, Portuguese	$31.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado Salt Lake City, Marysvale, Thompsons, Moab, White Canyon, and Monticello, Utah. Shiprock, and Bluewater, New Mexico, Edgemont, S. Dakota, Riverton, Wyoming. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello, Shiprock, and Bluewater	Per Pound V_2O_5 $0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois-Kentucky mines	$32.00
	Mexican. 70% f.o.b. border	$22.00
	European, Atlantic Ports, 70%	$30.00
	Acid Grade. 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado	$50.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

February 15, 1955

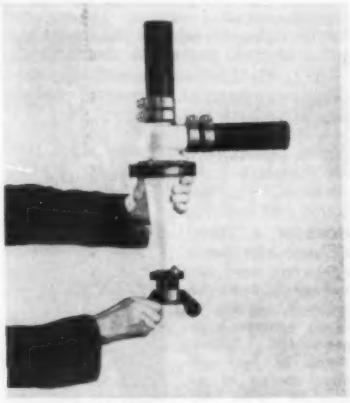
		Per Long Ton		USA Equivalent cents per pound[1]
COPPER:	**Electrolytic, spot**	£357	10s 0d	44.69¢
LEAD:	**Refined, 99.9%**	£104	5s 0d	13.03¢
ZINC:	**Virgin, 98%**	£ 91	5s 0d	11.41¢
ALUMINUM:	**Ingot, 99.5%**	£156	0s 0d	19.50¢
ANTIMONY:	**Regulus, 99.6%**	£210	0s 0d	26.25¢
TIN:	**Standard, 99.75%**	£716	0s 0d	89.50¢
TUNGSTEN:	**Long ton unit, 252s 6d-257s 6d equivalent** to			$35.36-$35.56

1. With Stering pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N. Y.

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.



New Porcelain Cyclone for Hot or Corrosive Feed

The Dorr Company announces the availability of the Type P50 CorrClone capable of separations in the 10 to 20 micron range on non-abrasive, relatively fine feed. Constructed completely of porcelain with a cone 50 millimeters in diameter, this new wet cyclone is particularly applicable to chemical, metallurgical and non-metallic classification problems requiring heat and corrosion resistant materials of construction. The type P50 DorrClone, approximately 18-inches in length and having a cone angle of 10°, will operate at pressures up to 80 psi with a maximum flow of 30 gallons per minute. Circle No. 67 for information.

Nordberg Constructs Mill For Major Cement Producer

The above picture of the large grinding mill was taken at the Nordberg Manufacturing Co. plant prior to shipment to a leading cement producer. This is one of five similar mills for grinding of raw materials and clinker to finished cement that were purchased from Nordberg for expanded operations.

Nordberg recently announced completing production of its 5,000th Symons cone crusher. Crusher No. 5,000 was one of 37 super heavy duty 7-foot Symons cone crushers which will be used to crush taconite. Number 5,001 will be delivered to one of the world's largest slag producers who already has a total of 63 Symons crushers. To learn about Nordberg's complete line of crushing and grinding equipment circle No. 62.

American Tractor's New Equipment Lease Plan

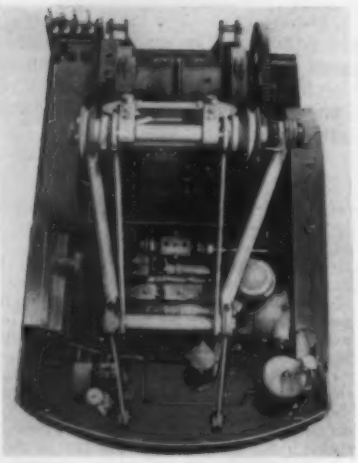
A revolutionary new equipment lease plan, with or without option to buy, and with as little as 10 percent cash down, has been announced by American Tractor Corporation; producers of TerraTrac crawler tractors and equipment. The new arrangement, featuring reduced payments during emergency periods, is believed to be the first plan of its kind in the entire equipment industry. Instead of being company or dealer-financed, like other limited lease plans, the broad American Tractor plan is financed through local banks, with endorsement by the company. The plan, with option to buy, amounts to a low-monthly-rental, low-interest-way of buying TerraTrac equipment, without having to tie up major capital. For full information on this lease plan and TerraTrac tractors circle No. 74.

Menlo Has Bead Tester For Uranium Prospectors

In the booklet, "Prospecting for Uranium," published by the AEC, a simple bead test is described which enables the prospector or laboratory technician to positively identify and confirm the presence or absence of uranium. This test is of great importance owing to the fact that more than thirty minerals are encountered in nature which, although radioactive, do not contain uranium. In using the new uranium tester, Menlolab Mark II, beads prepared according to the AEC test instructions, are mounted in the sample holder of the tester. Then the lens of the instrument is exposed to direct sunlight. When the bead, viewed through the eye-piece, fluoresces in the ultraviolet light as yellow or greenish-yellow, the test is positive for uranium. In the absence of uranium, no color is seen. The test is reported to be accurate to one part in ten million. The new instrument will be distributed through laboratory and prospectors supply firms. Circle No. 77.

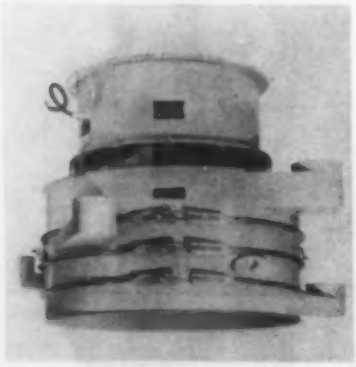
Pneumatic Sump Pumps Feature High Capacity

A pump to remove water from trenches and excavations has been developed by Schramm Inc. The pneumatic sump pump can be dropped in the water, eliminating priming. It is small and lightweight, easy to transport to the job, and requires small space for storage when not in use. It is operated by any 105 or 125 cubic-foot-per-minute compressor. For further information circle No. 63.



New Two-Yard All-purpose Excavator Built by Marion

The above photo shows the easily accessible machinery deck of the new Marion 83-M all-purpose excavating machine. As a two-yard shovel the 83-M was designed for use in mining and construction, but it can be easily converted in the field to a dragline, clamshell, pull shovel, or crane. The 83-M has special features designed to make it a 60-ton lifting crane. The machine has a high retractable and self-raising gantry. An independent boom hoist, optionally available, provides power both in raising and lowering of loads. For full data on the new 83-M circle No. 64.

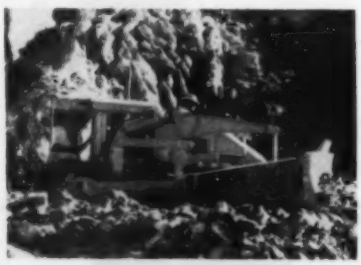


SWECO Vibrating Screen Separators—New Design

New tangential discharge spouts replace rectangular shape spouts on Sweco vibrating screen separators which are manufactured by the Separator Division of Southwestern Engineering Co. The tangential shape spouts permit greater efficiency and speed to develop in material as it spirals out on screen and through discharge. SWECO separators utilize a unique gyratory motion imparted by a vertically mounted motor. Weights attached to the motor shaft above and below the motor impart a vibratory motion to the entire screen frame assembly sitting on springs. The adjustment of these weights allows the operator to quicken or retard the travel speed of the material on the screens according to the type of material being classified. Circle No. 75.

Portable Gas Sampling Unit By Arnold O. Beckman, Inc.

A new portable gas sampling unit has been added to the line of instruments manufactured by Arnold O. Beckman, Inc. The Model Y-101 provides a compact system for bringing sample gas streams to an analyzer for measurement. It consists of a motor-driven pump, filter, flow indicator, valves, and a 20-foot power cord, all mounted and interconnected in an aluminum case. The unit may be attached to an Arnold O. Beckman Model C2P oxygen analyzer or can be supplied with a handle for independent operation. Bulletin 704 completely describes the sampler. Circle No. 61.



Eimco 105 Tractor Now Available as Bulldozer

The Eimco Corporation's 105 tractor is now available for bulldozer, winch and other attachments in addition to the loading attachment. Both loading and bulldozing attachments are Eimco products, but the tractor is built to standard SAE mounting dimensions, so that other attachments made with SAE standards will fit. The Eimco 105 is said to feature a number of firsts, some of which are gear shifting under full power in motion, instant reversals, and clutches that never need adjusting. Maneuverability is provided by independent track control, and the operator sits up front for greater comfort and ease in seeing what he's doing. Complete information can be had by circling No. 60.

Notes From The Manufacturers

Alan Parry, factory manager of Caterpillar Tractor Company's San Leandro, California plant since 1945, has been promoted to the position of manager of San Leandro operations. He succeeds *W. O. Bates, Jr.*, who retired from Caterpillar after 43 years with the firm.

R. G. Gehlsen, was recently appointed manager, electrical connector products, Joy Manufacturing Company. Mr. Gehlsen has been with Joy and the affiliated Mines Equipment Company since 1945. He was largely responsible for development of the Joy Safety Circuit Center.

GORDON K. TEAL, assistant vice president, has been appointed to head the research division of Texas Instruments Incorporated, Dallas, Texas. Dr. Teal will have charge of all research work for the electronics and geophysics firm. Previously he headed the materials and components research department, with primary responsibility for semi-conductor research. Prominent in the development of semi-conductor devices, Dr. Teal is credited with a major part in developing the single crystal form of germanium and the germanium junction transistor.

R. C. Woodward, chief metallurgist and consulting metallurgist for Bucyrus-Erie Company for 20 years, has retired from active service. The originator of the light weight cast steel tool wrench, he was also the first to use alloy steel for blast hole drill bits and to develop the "deep quench" method of treating alloy bits.

Bernard Schneider has been promoted to the position of chief engineer for the Conveyor Equipment section, Chain Belt Company, Milwaukee, Wisconsin.

Industrial Air Products Company has opened a new branch in Seattle, Washington, which will be headed by *Dale LeBrun*, formerly manager of the Yakima, Washington plant.

T. B. COUNSELMAN has left Dorr-Oliver, Inc., of Stamford, Connecticut to assume a post with Behre Dolbear and Company of New York, mineral consultants in mining, geology, metallurgy and management. Mr. Counselman has been closely associated with developments in the concentration of iron ore in Minnesota, the application of closed-circuit grinding for the wet process cement industry, and with blast furnace practice in pig-iron manufacture. Recently, as manager of Dorr's FluoSolids Sales Division, his primary responsibility was the development of new applications for the firm's new fluidized roasting techniques.

NEW URANIUM ROCK BIT: Herb J. Hawthorne Inc. has developed a new rock bit which is reported to be improving the efficiency of rotary drilling for uranium and other minerals on the Colorado Plateau. The new Type "E" Insert Rock Bit is available in sizes from "AX" to "NX". It consists of a series of replacable cutting blades, with edges of tungsten carbide inserts, that screw into the bit body. The bit will fit any drill rod or collar used in minerals exploration. Circle No. 51.

SHAFT MOUNTED DRIVES: Bulletin 7101 released by The Falk Corporation contains a comprehensive description and selection table of various shaft mounted drives. For a copy circle No. 33.

HIGH VOLTAGE STARTER: Now available is a new line of Air-Break Starters for 2200 to 5000 volt squirrel-cage, wound-rotor and synchronous motors. The unit was developed by The Electric Controller & Manufacturing Co., Cleveland, Ohio. Details can be obtained by circling No. 34.

VISCOMETER: An 8-page brochure illustrates the application of a new Swiss-made Viscometer to both laboratory and in-plant process and quality control. Copies are available from Drage Products, Inc., 406 32nd St., Union City, New Jersey, or by circling No. 44.

MINERAL DRESSING: Western Machinery Company has available a new bulletin which contains valuable, up-to-date mineral engineering information. It provides a store of useful information for ready reference by mine managers, general and mill superintendents, metallurgical and process engineers, design engineers, millmen, students, and others. This is a must, so circle No. 1.

PIPING PROBLEMS: Learn how Naylor Pipe, manufactured by the Naylor Pipe Company, can solve your piping problems in carrying fresh water, tailings, high and low pressure air, etc. Naylor Pipe has available two bulletins; one giving pipe sizes, types of fittings, and fabrications to meet layout requirements; and the other on Naylor Wedge-Lock couplings. For your copies circle No. 2.

GET THE INSIDE STORY on faster cooling, minimum floor space and drive power of the improved calcine cooler manufactured by The Stearns-Roger Mfg. Co. To do this circle No. 3.

TORQUE CONVERTERS: "Torcon" torque converters for application in heavy-duty, off-the-road vehicles as well as for stationary power plants is being produced by Clark Equipment Company's Automotive Division. An optional feature offered on the new units is a "free wheel" mounting for the stator which enables the unit to act as a fluid coupling when the load decreases. For further information circle No. 29.

CARBON BRUSH KIT: The Ohio Carbon Company of Cleveland, Ohio, announces the availability of carbon brush kit number 7-A which contains 20 types and sizes of brushes. For further details circle No. 42.

GREATER HORSEPOWER and faster engine speeds for the D6, D4 and D2 Tractors has been announced by Caterpillar Tractor Co., Peoria, Ill. Drawbar horsepower of the D6 has been increased from 66 to 73; the D4 from 43 to 48 horsepower; and the D2 from 35 to 38 horsepower. Circle No. 49.

URANIUM PROSPECTORS: El-Tronics has introduced a new line of Geiger and scintillation counters. A free brochure gives complete specifications and prices. Circle No. 6.

POWER TRANSMISSION: Philadelphia Gear Works, Inc. has announced a catalog which covers their line of herringbone gears and speed reducers. To learn more about how Philadelphia heavy duty industrial drives can help you circle No. 7.

LIMITORQUE is a new motorized, push-button valve operation. LimiTorque operates at the mere push of a button and, thus, is claimed to save time, labor, and money required for manual operation of valves at distant or inaccessible locations. LimiTorque is also said to have many other important advantages. Catalog L-54 will give you complete information. Circle No. 8.

TRANSITE PRESSURE PIPE: A 23-page booklet has just been released by Johns-Manville giving information and specifications of their Transite pipe. Some of the most important uses of Transite pipe are in conveying acid mine waters and corrosive mill solutions. Circle No. 9.

HYDROSEAL CATALOG: The Allen-Sherman-Hoff Pump Co. has announced a new catalog covering its line of Hydroseal pumps. To receive one for your files circle No. 4.

NEW-TYPE GEIGER COUNTER: The Radiac Company, Inc. has designed and constructed a new Geiger counter, the PROSPECTOMETER, for uranium and thorium prospecting. Radioactivity is signaled by the PROSPECTOMETER in three different ways, all at the same time: loud earphone clicks, meter indication, and flashing neon light. The PROSPECTOMETER was designed to meet strictest AEC and U. S. Geological Survey requirements. To learn more about it circle No. 5.

THE HIAB TRUCK CRANE loads, unloads, transfers, drags and does many more useful things. It can easily be installed on common types of trucks, and only requires a small amount of space. The lifting capacity of this hydraulic crane is 2,200 pounds. No. 12 is the one.

SURVEYING INSTRUMENTS: Wild Heerbrugg Instruments Inc. announces the Swiss precision-designed Wild T-1 optical repeating transit. Both the horizontal and vertical angle are read through a microscope alongside the telescope eyepiece. An Optical micrometer eliminates possibility of reading errors. Illumination is provided by a daylight mirror or battery attachment for underground work. For complete data circle No. 13.

SINTERING AND PELLETIZING: The Dravo Corporation Machinery Division now has an exclusive licensing agreement with Lurgi Gesellschaft fur Chemie und Huttenwesen, M.B.H., Frankfurt, Germany, whereby Dravo will manufacture and distribute Lurgi designed equipment in the United States. A four-page bulletin briefly describes the process and equipment perfected by Lurgi during their more than 40 years experience. Circle No. 14.

INDUSTRIAL GUN manufactured by the Remington Arms Company, Inc. is finding wide application in the mining and metallurgical field. The gun weighs about 176 pounds and shoots a slug from an 8-gage shell. It is successfully being used to remove kiln rings, overhangs in open pits, unclog mine chutes, scale roofs, etc. Circle No. 15.

HIGH VOLTAGE SPLICING instructions are given in an outstanding brochure prepared by the Simplex Wire & Cable Co. This valuable brochure is an absolute must for anyone working with high voltage cable. To receive your free copy circle No. 10.

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to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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B-E ROTARY BLAST HOLE DRILL: The Bucyrus-Erie Company now has available a booklet describing its 50-R blast hole drill. The 50-R is designed to put down 9⅞- to 12¼-inch diameter holes. Rotary drive machinery is powered by an electric motor and is Ward Leonard controlled, a first for rotary blast hole drills. B-E's 50-R also has many other firsts. Circle No. 38.

FIRST HOISTING ROPE to be used for uranium mining on the Colorado Plateau was reported sold by the Cate Equipment Company. The rope is Bethlehem 1⅛-inch non-rotating wire rope. At the present time it is being used to hoist development rock from a crosscut being driven to the ore bed from the bottom of the shaft. For more information on Bethlehem wire rope circle No. 16.

WILLISON AUTOMATIC COUPLERS are described and illustrated in a 23-page catalog compiled by the National Malleable and Steel Castings Company. To learn how they may help you circle No. 11.

SPRAY-LUBE, a new type pressure lubricant, has been announced by the Pressure Products Company. Spray-Lube now makes it possible to spray a superior, heavy duty lubricant on open gears, open chains, valve stems, etc. Its effortless application will encourage proper lubrication of machinery that otherwise would be neglected. For additional information circle No. 48.

FLIP SEAL CONNECTORS: The Rodale Manufacturing Company, Inc. is now introducing the Flip Seal, a new type of positive sealing and locking electrical connector. At both ends of the Flip Seal connector the cable entrances are also provided with a sealing action. These actions seal out moisture, dirt, dust and metal particles which tend to interrupt the flow of current. The connector components are molded of rugged phenolic, and completely encased in a rubber or Neoprene housing, assuring that the unit will withstand severe punishment. For more data circle No. 50.

BUCYRUS-ERIE TRANSIT CRANE: A 12-page bulletin describes the 15-B transit crane of the Bucyrus-Erie Company. The 15-B is a mobile, ½-yard crane-excavator, easily convertible to shovel, dragline, clamshell, or dragshovel for handling a wide range of lifting and excavating jobs. Circle No. 30.

FEINC HORIZONTAL FILTERS: Filtration Engineers, Inc. describes their FEinc horizontal rotary vacuum filters in Bulletin 202. These filters manufactured in sizes of from 3 feet to 12 feet in diameter are recommended for coarse crystalline materials, fibrous pulps and other free-settling or free-filtering applications. For Bulletin 202 circle No. 39.

LE ROI 85 AIRMASTER: The Le Roi Division of Westinghouse Air Brake Company has available a bulletin which illustrates construction features and gives specifications of the 85 cubic foot per minute Airmaster compressor. Circle No. 40.

SAFETY EQUIPMENT CATALOG has been prepared by the E. D. Bullard Company, manufacturers of industrial safety equipment. The catalog is designed to give complete information on all Bullard safety products in a quick and efficient manner. For your copy circle No. 41.

"MENLOLAB MARK IV" is the name of a new Geiger counter manufactured by Menlo Research Laboratory. The new counter is 40 percent lighter than similar instruments and is 50 percent less bulky. Simplified controls, eliminating the necessity for frequent recalibration is only another one of the more than twenty improvements incorporated in the Menlolab Mark IV. Circle No. 43.

URANIUM PROSPECTORS: Allied Geophysics has announced a new scintillation counter, SINTA-SCOPE, and Geiger counter, COUNT-O-SCOPE. The SINTA-SCOPE is a completely portable field instrument with a fast time response for optimum car and airborne detection of narrow outcrops. THE COUNT-O-SCOPE has a precision mechanical counting scaler which is reported to be more accurate than any fluctuating meter hand. For more information circle No. 45.

NEW NUCLIOMETER: The Detectron Corporation has developed a new radiation detection instrument for locating deep-hidden radioactive ore bodies. Because of its sensitivity the new instrument can be used for airborne and grid map surveys in addition to regular prospecting methods, and assay estimation of specimens. The DR-299 NUCLIOMETER has many important features, one of which is a scale that reads directly in percent of ore. Circle No. 52 for complete information.

WEMCO'S NEW DIAPHRAGM PUMP: The Western Machinery Company is now in production of a new line of Wemco diaphragm pumps. The new Wemco pump is small, compact, and streamlined to fit into a flowsheet with less installation costs. This is only one advantage of the new pump. For full information circle No. 47.

P&H PARADES ITS PRODUCTS: A booklet just released by the Harnischfeger Corporation is streamlined with essential facts and capacities on P&H overhead cranes, electric and chain hoists, arc welders, truck cranes, power shovels, Diesel engines, etc. The bulletin also includes a large-size map showing locations of P&H plants, branches, warehouses and parts depots, sales offices and dealers. To receive your copy circle No. 32.

NORDBERG SKIPS AND CAGES: To more completely serve the mining industry, Nordberg Manufacturing Company has announced that it will build a broad range of skips and cages. To learn more about this new Nordberg line circle No. 35.

SL MINERALIGHTS can now be operated with a heavy-duty 6-volt battery for longer periods of time, giving greater battery life. This is made possible by an adapter and pack which Ultra-Violet Products, Inc. has developed for their SL Mineralights. Circle No. 17.

8,000 UNIVERSAL GEARS: A 200-page catalog has just been published by Universal Gear Works, Inc. Features of this large catalog are specifications and prices of over 8,000 stock items including gears, sprockets, chains, etc. For your copy circle No. 23.

PROPERTIES OF REFRACTORIES are told of in a recently published booklet put out by the Carborundum Company. Those who require a knowledge of refractories will find this booklet very interesting and valuable. Circle No. 26.

INCREASE TRACTOR USEFULNESS: "Fleco Specialized Equipment" is the title of an informative new booklet released by Fleco Corporation. Available in English, French, Spanish and Portuguese, the colorful, 8-page booklet shows, and describes in detail, the complete line of specialized tractor equipment made by Fleco for tractors of all sizes and makes. Learn how you can increase the usefulness of your tractor by circling No. 18.

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Pacific Tin Negotiating For Feldspar Companies

In a major step toward diversification of operations, the Pacific Tin Consolidated Corporation of New York has reached an agreement with the Rogers and Deneen families and their associates to purchase several companies that mine, process, and sell feldspar in North Carolina, Georgia, and Tennessee. Pacific Tin's current operations are in dredging for tin in Malaya.

Four feldspar firms and their plants are included in the purchase: Feldspar Flotation Company at Spruce Pine, North Carolina; Feldspar Milling Company at Bowditch, North Carolina; North Carolina Feldspar Company at Erwin, Tennessee; and Appalachian Feldspar Company, at Monticello, Georgia. The latter has only recently been placed in operation. These companies account for about 25 percent of the feldspar production in the country.

No price has been revealed, and consummation of the agreement depends upon certain legal details. However, the company has indicated that present management and operating personnel of these firms would be retained.

Vulcan Acquires Interest In So. Carolina Firm

The Vulcan Silver-Lead Corporation of Wallace, Idaho has acquired the 50 percent interest of its parent company, Callahan Zinc-Lead Company, in a joint venture known as Perry Minerals Company. Exploratory drilling by Perry Minerals in Aiken County, South Carolina last year had indicated more than 18,000,000 cubic yards of commercially dredgable materials containing values of more than 30 cents per cubic yard in heavy minerals, including titanium-bearing ore and zircon. The 685-acre leases were subsequently turned over to Marine Minerals, Inc., a subsidiary of Crane Company, in return for a five percent interest in the heavy minerals produced and all of the sand and gravel byproducts.

Joint Statistical Survey By Mines, Census Bureaus

The United States Bureau of Mines (Department of the Interior) and the United States Bureau of the Census (Department of Commerce) are cooperating this year in the gathering of statistics of mineral production and other operations of some 40,000 establishments in the country's mineral industries.

The joint undertaking is to assure that the special knowledge of Bureau of Mines' technically trained commodity experts and the special skills of the Census Bureau in the collection, summarization, and publication of masses of statistical data are effectively blended in the conduct of the first Census of the Mineral Industries to be taken since 1939. The joint form they will issue is expected to provide against duplication of effort and thereby reduce the reporting burden on the mineral industries.

The Bureau of Mines collects information annually, on a voluntary basis, to provide statistics on mineral production. The Bureau of the Census at longer intervals, normally every five years, collects additional information on employment, expenditures, equipment, and other items related to mineral production. Replying to the Census questionnaire is required by law.

The White Pine project of *White Pine Copper Company* at Ontonagon, Michigan is moving ahead as planned. Development of the mine, construction of buildings, and installation of equipment in the mill, smelter, and power plant, with necessary auxiliary facilities for townsite and plant, have been essentially completed. Most are now either being tested, started up, or are already in operation. First copper from the mine was poured in January, and capacity production is expected by the middle of the summer. This means 12,500 tons of ore per day in the mine. The smelter will produce 75,000,000 pounds of refined copper annually. White Pine is a subsidiary of *Copper Range Company*.

Production operations at the *Peninsula* mine of the *Calumet Division, Calumet & Hecla, Inc.* were shutdown for 31 days while repair work was done on the steam hoist. During this period, employees of the mine were transferred to the division's *Centennial, Seneca,* and *Ahmeek No. 3* mines, and to the hoist repair job. Three-shift, around the clock schedules were set up at the Centennial and Seneca to provide for additional personnel. The Peninsula hoist was completely removed and an identical hoist torn down so its parts could be used on the Peninsula hoist frame. The idle hoist, located in the Peninsula hoist house, formerly was used for Ahmeek No. 3 mine. It took only 19 work days and 48 shifts to complete the job which had originally been estimated to take six weeks. Production at the Peninsula is about 1,000 tons of ore per day, but the increased shifts at the Centennial and Seneca made up for much of this loss.

Recently incorporated in North Dakota was *North American Uranium, Inc.* of Jamestown. Capitalized at $300,000, J. H. Archer is president; R. O. Melland, vice president; John Hjellum, secretary-treasurer; and Edward Erie, Daniel Preszler, Orville Christianson, and Paul B. Bagan, directors.

Great Lakes Mining Company, Inc. has been organized in Milwaukee, Wisconsin "to conduct the business of mining, milling, and dealing in gold, silver, copper, etc." Incorporation papers were signed by Lionel E. Weyenberg, Richard B. Surges, and Richard Amacher. Mr. Surges has been named as the registered agent for the firm.

The North Dakota Geological Survey at the University of North Dakota and the University of North Dakota School of Engineering are planning to conduct a full-scale investigation of uranium deposits along a 50-mile strip in the western part of the state.

Dakota Oil Enterprises, headed by J. H. Archer of Jamestown, North Dakota, reports the finding of uranium ore in samples south of Medora, which assayed 0.07 percent, and that the Northern Pacific Railroad which holds property in this area plans to undertake some uranium prospecting on its property next summer.

Hanna Operates Newest Great Lakes Ore Carrier

The "George M. Humphrey," newest ship on the Great Lakes, completed nine trips in the 1954 iron ore shipping season and carried a total of 193,169 gross tons. The average per ship was 21,463 gross tons. It set a new record for the Great Lakes when it loaded 21,762 tons at Alleuez, Wisconsin, on its maiden trip, October 14. The Humphrey has the largest capacity of any vessel in the Lake Superior fleet. It is owned by National Steel Corporation and operated by the M. A. Hanna Company. It has the distinction of being the largest freighter ever built on fresh water. It was built at the Lorain, Ohio yard of the American Ship Building Company; the Arnot Jamestown Division of the Aetna Steel Products Corporation did the joiner work. The ship is 710 feet long and has a beam of 75 feet which also makes it the widest ship on the Great Lakes. One of its most unique features is the size and spacing of the hatches. Principal objective of the wide hatches is to facilitate operation of the grab buckets on the man-trolley type bridge cranes used in unloading ships at lower lake ports.

Mifflin Mining Company at Mifflin, Wisconsin expects to resume zinc-lead operations next month after being shut-down for the winter.

Production of the first successful true centrifugal casting of titanium has been achieved as result of metallurgical research at the *Armour Research Foundation of Illinois Institute of Technology*, Chicago. Pouring of the first sound casting of this type followed studies conducted at the Foundation under the sponsorship of *Wisconsin Centrifugal Foundry, Inc.* A number of castings, weighing from 3.3 pounds to 9.0 pounds, have been produced. Melting of the pure titanium by the new method prevents contamination from furnace and mold materials, according to Jack W. Giddens, ARF research metallurgist, and Donald H. Turner, assistant metallurgist, who developed the process. One of the principal advantages expected to result from the development of centrifugal castings of titanium lies in the metal's resistance to certain types of corrosion.

The *Phosphate Minerals Division* of the *International Minerals and Chemical Corporation* set four all-time production records for concentrate and pebble rock phosphate in Florida in December as more product was made at *Noralyn*, *Peace Valley*, and *Achan* mines than ever before. The records were: (1) An all-time daily record on December 30 for total tonnage produced; this was broken again on December 31. (2) December tonnage outstripped all other monthly production totals since the firm has operated mines in the Florida field. (3) A new quarterly record for total tonnage produced was set; the previous quarterly high was made during the previous period ending September 30. (4) A new six-month record for total tonnage was set during the half year ending December 31. Most of the previous monthly record tonnage totals had been made with Noralyn and Peace Valley mines operating three shifts daily on a seven-day week. During recent months, the Peace Valley and Achan were on a five-day week.

The General Services Administration reports that its seven research studies designed to open substantial resources of low-grade manganese to steel manufacturers at economic cost are making good progress. The GSA recommends that the program be extended for another 18 months. The work is being carried out by private contractors as follows: *Southwestern Engineering Company*, flotation, applies to ores in different states, including Aroostook County, Maine; study, now complete, carried out at Los Angeles, California. *Manganese Chemical Company*, leaching, applies to Cuyuna ores, in progress at Riverton, Minnesota. *Nossen Laboratories, Inc.*, leaching, applies to Aroostook ores, in progress at Paterson, New Jersey. Dr. L. W. King, leaching, low-grade ores in widely scattered areas, pilot plant in construction at Salem, Ohio. *Mangaslag, Inc.*, pyrometallurgical, applies to slags, pilot plant in operation at Pittston, Pennsylvania. *Bruce Williams Laboratories*, roasting-leaching, applies to all ores and slags, soon to enter pilot plant stage at Joplin, Missouri. *Diamond Alkali Company*, pyrochemical (Sylvester process) applies to slags and ores, under consideration for test operation at Painesville, Ohio.

The United States Senate Interior Committee has instructed its minerals and materials subcommittee to study the national stockpiling program for vital materials to see if it is adequate and if it is aiding the domestic miner.

Freeport Sulphur Company reports that its new *Garden Island Bay* mine near the mouth of the Mississippi produced over 500,000 tons of sulphur in its first year of operation.

The *St. Joseph Lead Company's Edwards Division* at Gouverneur, New York reports that the *Balmat* and *Edwards* zinc mines produced at capacity throughout last year. The Balmat's capacity is about 1,800 tons of crude ore per day, while the Edwards has a daily capacity of about 400 tons. During the year the division produced about 100,000 tons of zinc concentrate or about 330 tons daily.

The extensive modernization program now being carried out in the *Sterling* mine of *New Jersey Zinc Company* at Ogdensburg, New Jersey is nearing completion. The new shaft, deepest of any of the company's zinc mining operations (at 2,700 feet), has been completed, along with the 100-foot steel headframe. The ore hoist is driven by two, 450-horsepower motors. A major change in processing, which will eliminate milling of crude ore into concentrates, necessitates installation of new crushing and grinding equipment, both underground and on the surface. Construction has started on a surface plant where crude will be dried, finely ground, screened, and delivered to a new 570-foot conveyor belt system which will transport it to storage bins for ultimate loading and shipping to the company's Palmerton smelter. Four 2,000-cubic-foot air compressors have been installed to furnish compressed air to all parts of the mine for operation of the rock drills and other equipment. New mine cars and locomotives are being placed in service to step up efficiency of ore haulage. A modern shop building has been constructed and equipped.

Electro Metallurgical Company, a division of *Union Carbide and Carbon Corporation*, has started production of electrolytic manganese at its new Marietta, Ohio plant. The plant will have a capacity of about 6,000 tons a year when all electrolytic units are in full operation. The process produces minimum 99.9 percent pure manganese metal in plate form about ¾ inch thick.

Aluminum shipments for civilian use will set another new record in 1955 for the second year in a row, with total consumption, both civilian and defense, totaling an estimated 3,200,000,000 pounds. This is approximately the same total as for 1953 and is 300,000,000 pounds higher than in 1954, but represents a far higher rate of civilian consumption in

view of the decrease in defense consumption.

A new barge loading dock has been constructed to facilitate shipments from the *St. Joseph Lead Company's* smelter operations at Monaca, Pennsylvania. Located on the Ohio River, the central point of the dock is a 31-foot diameter cell of steel sheet pilings to support a whirley crane that will transfer zinc from shore to barge.

The Supervisor of the North Carolina National Forests, Don J. Morris, says that uranium prospectors are "wasting their time" staking and filing claims in the 1,122,000 acres of North Carolina national forest land. Recent amendments concerning uranium exploration applied to the public domain but not to land acquired by the United States government, he says. Most of it is open to prospecting for uranium but a permit must be obtained. A staked and recorded claim gives the claimant no preference whatever should he later wish to apply for a mining permit. The latter are issued by the Bureau of Mines. Recently prospectors have been marking and defacing the landscape with their claim markings, some of the worst examples occurring along Highway 181 in Pisgah forest.

The *Mica Fabricators Association* is seeking a cut in tariff on imports of mica from the Federal Trade Commission.

American Cyanamid Company, with headquarters for phosphate mining at Brewster, Florida, has purchased at least 1,000 acres of land southeast of Bartow, Florida, for more than $700,000 according to deeds filed.

IRON RANGES

Effective January 3rd, *Oliver Iron Mining Division* of *U.S. Steel Corporation* returned its Mesabi Range operations to a 40-hour work week. Since October the division had been on a four-day, 32-hour week. In addition approximately 440 men were added to the work force in the Hibbing-Chisholm and Virginia-Eveleth districts. Work at the mines has been stepped up in anticipation of heavy shipping schedules in the coming season.

Among the new beneficiation plants that will go into production at the start of the 1955 season is a heavy media and jig plant at *Jones & Laughlin Steel Corporation, Minnesota Iron Ore Division, Wentworth* mine, east of Aurora, Minnesota. The mobil mill previously installed at the Grant mine is now being set up at the Wentworth. This has been supplemented by the installation of a 5-foot by 16-foot and a 5-foot by 11-foot Remer jig to handle the fines. The Wentworth is the furthest east of all of the gravity concentrating plants on the Mesabi Range.

During the winter months, *M. A. Hanna Company* has started to dismantle its plants at the *Buckeye* and *Section 18* mines. Both properties have been exhausted. Part of the equipment will be used at the fines plant which is being transferred from the *Patrick* to the *Harrison* to retreat material from the old tailings pond. The relocated plant, now known as the Harrison "B" fines plant, is expected to be ready for operation at the start of the season.

The *Oliver Iron Mining Division* of the *United States Steel Corporation* has delayed plans for the "start-up" of the new HMS and cyclone plant at the *Gross-Marble* mine until 1956. Foundations for the plant have been completed and erection of the steel is to start shortly.

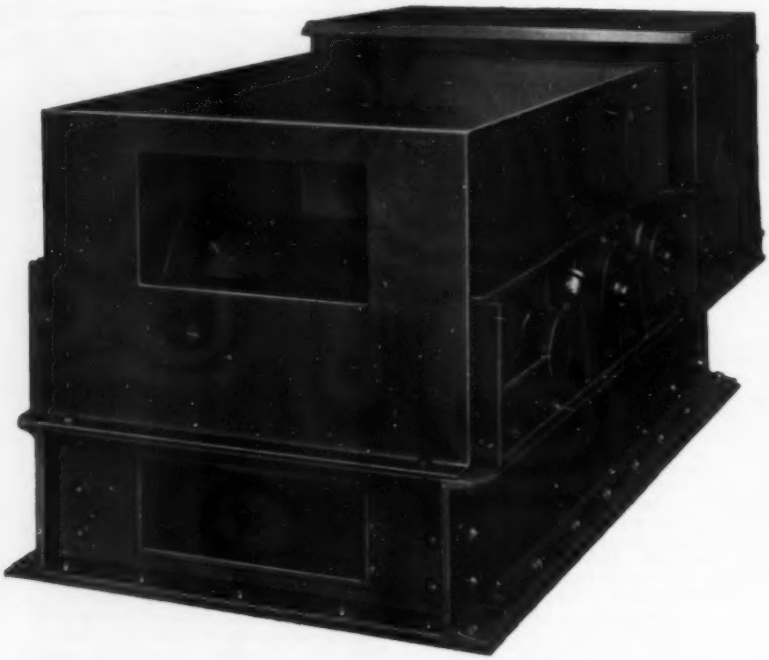
The *Blueberry* iron mine seven miles west of Ishpeming, Michigan has been closed because of depletion of the ore reserves. Operated by *North Range Mining Company* since 1933, the mine has originally been explored by the *Palms-Book Land Company* in 1925, and then leased to the *Ford Motor Company* which began mining in 1928. During its period of operation, the mine produced 6,000,000 tons of ore, and had been mined to a depth of 2,000 feet.

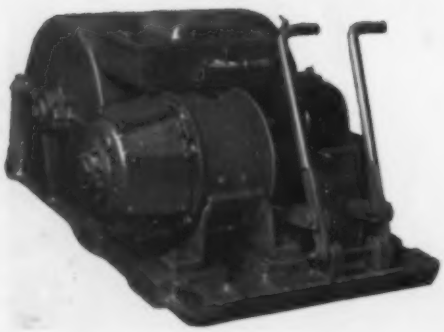
Oliver Iron Mining Division of the *United States Steel Corporation* recently placed an order for 30 Western, 40-cubic-yard, 100-ton, dual-side, pivot drop door, automatic dump cars with the *Baldwin-Lima-Hamilton Corporation*. The new cars will be used for open-pit mining service in the Canisteo district, Coleraine, Minnesota. To meet the rigorous service of handling maximum loads under adverse conditions and sub-zero temperatures, they will be equipped with the largest air dump cylinders ever used on this size car. The trucks will be equipped with roller bearings, and the couplers will incorporate the new type rubber draft gear. Delivery is expected to be made in April.

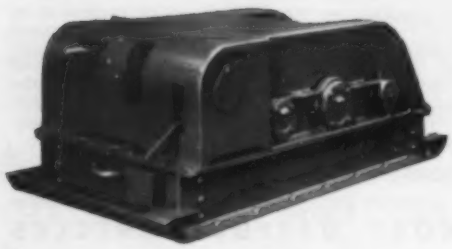
Several extensive belts of strong magnetic attraction which possibly indicate iron-bearing formations have been reported by Dr. G. M. Schwartz, director of the Minnesota Geological Survey. The magnetic belts are outlined on maps released by the Minnesota survey and the United States Geological Survey. Eight northwestern counties are covered in the maps—Kittson, Rosseau, Marshall, Pennington, Polk, Beltrami, Clearwater, and Red Lake. Three major zones of abnormally high magnetic attraction stand out:

1. Two parallel belts extending through northern Kittson and Roseau counties parallel to the international boundary.
2. A series of belts extending from the northeast corner of Marshall county southwestward through Marshall, Pennington, Red Lake (passing between Thief River Falls and Red Lake Falls) and Polk counties to the Red River of the North. Two southern forks of this zone straddle the city of Crookston.
3. A curved belt through southern Polk county running from Erskine westward through Dugdale and then south to Beltrami.

Professor Schwartz emphasized the necessity of checking the results of the aeromagnetic survey readings by means of careful ground surveys and core drilling in zones which appear "promising" before making any predictions as to the existence in these areas of commercially interesting iron deposits.







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Rare Metals Acquires Arizona Uranium Property

The Rare Metals Corporation of America has acquired all of the capital stock of Arrowhead Uranium Company, and its properties in the vicinity of Cameron, Arizona where Arrowhead has been producing uranium ore for the past two years. Rare Metals is now drilling the property (located on the western side of the Navajo Indian Reservation) to determine the amount of proven ore reserves, and plans an extensive exploration program on the other lands in the area to develop additional reserves.

An application has been filed with the United States Atomic Energy Commission for the erection of a mill on the western side of the reservation. Rare Metals has already undertaken engineering on the mill with present plans calling for the mill to process ores of other producers in the area, as well as those of Rare Metals.

Mining operations have been by open pit, but those in the future will be by underground drift mining.

Rare Metals is owned by El Paso Natural Gas Company, Western Natural Gas Company, and the employees of these two firms. Exploration and operating headquarters have been established in Salt Lake City. C. L. Perkins is vice president and general manager.

Verdi Will Convert Mill For Uranium Treatment

Verdi Development Company's board of directors has approved the purchase of the Beck gold mine near Mt. Soledad, Kern County, California, and its conversion to a uranium milling and leaching plant. Cost of purchase and conversion will be about $100,000.

According to President Clifford Gillespie, sufficient ore has been blocked out to warrant immediate use of the mill. Three crews are drilling and mining on open cuts in the property and have started stockpiling until the 50-ton-per-day mill is completed.

Verdi is now in the process of acquiring new uranium leases in the vicinity of its present holdings in the Rosamond area of the Mojave Desert, and is negotiating for others, some as far away as the Colorado Plateau.

Some shipments of columbium, beryl, tantalum, and lithium have been made from the *Midnight Owl* property, north of Wickenburg, Arizona. The property adjoins the Anderson Brothers holdings and is leased from them by Lester Fritz of Phoenix, Arizona.

The *Ray Mines Division* of *Kennecott Copper Corporation* at Ray, Arizona, closed the underground section of its mine on January 28 and in the future will operate exclusively as an open-pit producer. The last ore from the historic Number Two section was mined by the night shift, January 28, and underground work now is confined to salvage operations and preparations for leaching within the underground area. Production from the open pit will be increased to equal previous production from both open-pit and underground sections. In 1954, the Ray Mines Division produced approximately 80,500,000 pounds of copper. A. P. Morris is general manager.

Banner Mining Company reports that its new Pima copper concentrator is producing at the rate of 425 tons per day. Only two of the company's three mines in Pima County, Arizona are presently operating. At *Mineral Hill* mine, the largest, production is from three levels and development has reached 700 feet in depth. The *Daisy* mine produces from four levels, the deepest being 430 feet. No production has been taken from the *Plumed Knight* yet, where diamond drill exploration is still going on.

A recent acquisition of the Thornburg brothers is the *Ord Mercury Mines* at Payson, Arizona. This mine employs 26 people and produces 150 pounds of mercury daily, with production expanding. The Thornburgs also own the *American Asbestos and Cement Corporation* at Young which produces both asbestos and uranium, and includes an asbestos mill. Their *Tucson Uranium Company* reportedly has about 1,200 tons of ore stockpiled. They have also purchased several other companies under the name of *Thornburg Uranium Company*, and have two mines ready for production in the Globe area, both awaiting completion of the sampling plant at Globe.

United Uranium, Inc. at Boise, Idaho has leased a uranium prospect 10 miles west of Pipe Springs National Monument, Mojave County, Arizona. J. W. Melrose, Spokane, Washington consulting geologist, has recommended wagon drilling with a Ducon collector to depths of about 100 feet. Jesse Lackman of Boise is president.

Ike I. Arnn and Clyde Hutcheson of Flagstaff, Arizona, as lessees are building a road to the *Far View* claim, eight miles southwest of Cottonwood, Arizona. The claim is a raw prospect on which several spots of radioactive material are said to have been found by the owners, C. F. Apperson, L. D. Jackson, and W. W. Fry, all of Cottonwood. The lessees are reported to be planning some extensive prospecting consisting of open cuts and drilling.

The *Mohave Mining and Milling Company* at Wickenburg, Arizona is mining approximately 500 tons per day of crude manganese ore from the *Price* and *Priceless* claims, four miles northeast of the Alamo Crossing. The property is operated under lease from the *Arizona Manganese Corporation*. The ore is mined by open-pit method, then up-graded in the company's mill which consists of a log-washer and sink-float equipment. The lessees are planning the addition of jigs, flotation, and sintering equipment at the mill in order to produce a 40 percent plus product for direct shipment to users. Officers of the company are: H. F. Lynn, president; Ralph G. Godfrey, general superintendent; and A. B. Campbell, secretary.

Spencer Uranium Company reports the discovery of a channel of carnotite-uranium ore in the open pit *Yazzia* mine close to the *Monument No. 2* mine of *Vanadium Corporation of America* in Apache County, northern Arizona. Overburden is being stripped and the ore mined by open-pit methods. A sample shipment to *Kerr-McGee Uranium Industries'* mill at Shiprock, New Mexico assayed 0.5 percent U_3O_8. About 200 tons have been shipped. Sherron F. Spencer of Mancos, Colorado is president of the firm; Edward F. Mabey and Owne W. Bunker of Salt Lake City, Utah, are vice presidents.

New Idria Mining and Chemical Company of Idria, California has acquired the *Strawberry* tungsten mine near Yosemite National Park, Madera County, for $1,075,000. The previous owners, *Strawberry Tungsten Mines, Inc.*, dissolved their company and in the future the mine will be operated as a division of New Idria. M. C. Richardson, general manager, and the staff are being retained. The mine employs 75 men, and mines and mills 125 tons daily. The mine office is located in Fresno.

The *Glidden Company* is actively exploring its *Bully Hill* mine on Lake Shasta, near Redding, California. About $30,000 per month is being spent in pumping out old shafts and test drilling for zinc ore. The mine was abandoned when Shasta Dam was built, and lake water seeped into the mine's tunnels. The mine is now accessible only by boat. If any ore were to be shipped, it would have to be moved by barge to a railroad depot. E. L. Ralston is manager of the mine.

Restrictions on the *Miracle* mine uranium property in Kern County, California, purchased by *Wyoming Gulf Sulphur Company* of Cody, Wyoming last fall, have now been removed and the company is spending an estimated $15,000 per week on development work. The drift is being widened, tracks are being laid for hauling of ore by miniature gondola cars, a Diesel compressor has been installed, and power supply increased from 2,200 volts to 11,000 volts for operation of heavier machinery. The property had been on the Federal Power Commission's "Power Withdrawal" list, as much of the land along the Kern River is, but the entire 400-acre site has now been removed from this list.

American Potash & Chemical Corporation has announced a reduction in the price of lithium carbonate from its main plant at Trona, California, from $1.00 per pound to 90 cents per pound, delivered, in carload lots. The reduction was made possible by increased production facilities at the Trona plant.

Eldorado-Plumbago Mines Consolidated, Inc. of Nevada is currently reopening the *Eldorado* gold mine near Alleghany, California. About 200 feet near the portal have been reopened and retimbered, and the El-Dorado quartz vein has been sampled. The major plan is to continue on the El-Dorado vein into the Plumbago claims which are believed to have a continuation of the large ore body never before mined. It is for

this reason that the El-Dorado and Plumbago groups have been combined. A mill is planned for later in the season, after blocking out of the ore body has been completed.

Uranium has been discovered in the Pozo area of San Luis Obispo County, California by Ray Wakefield, Robert Wakefield, and Bruce McGray, all of Santa Maria, and Robert E. McDonald of Arroyo Grande. The discovery is 75 miles northeast of Santa Maria in Los Padres National Forest. The group have staked 19 locations in the claim, covering a half-mile area. In the rugged Chews Ridge area about 30 miles south of Carmel Valley and 45 miles southeast of Monterey, California another uranium rush is going on. Robert Steele of Fresno filed nine claims near Tassajara Hot Springs. This is in the northern part of the Los Padres National Forest.

The *Nevada Mines Division* of *Kennecott Copper Corporation* has gone on a seven-day work week in anticipation of a continuing strong demand for copper. Monthly production is expected to be increased from 8,500,000 pounds of blister copper to about 9,750,000 pounds. Operations affected by the new working schedule are the mine, mill, and ore delivery service where they have been on a six-day week. The smelter has been on seven-day schedule for some time and will not be noticeably affected.

Drilling at the old *Copper Cliff* properties 15 miles west of Yerington, Nevada is reported to have revealed 500,000 tons of 2.5 percent oxide and sulfide ores. A lessee, R. E. Morris of Gardnerville, Nevada, who holds a 10 percent royalty, made assays of the ore. The oxides are between 100 and 300 feet deep; the sulfides are below those levels. A syndicate has been formed to develop the 24 claims covering the deposit. E. R. Lund of Salt Lake City, Utah, and Atlantic City, Wyoming, is one of the organizers.

The *Silver Bell Uranium Company* has been formed by William Graham and Mike Depeano of Reno, Nevada, along with several associates, to develop potential uranium claims in rugged mountain country 150 miles south of Reno. Mr. Graham and Mr. Depeano purchased 19 claims in the area last August for $175,000. They were bought from E. T. Smith, an 86-year-old prospector who discovered the uranium ore. The two men then acquired 48 more claims nearby, which are said to carry gold, silver, and lead ore as well. The company has now been formed and development work is going on.

The *Mohawk* property of *Bruhi Enterprises* in Esmeralda County, Nevada will be placed in operation as soon as possible and steps in this direction are already under way. The mill is being enlarged and rearranged to treat the mine's silver-manganite ore in the most efficient and economical way. Enough ore is reported to have been blocked out for three or four years of operation. W. Church Holmes, formerly metallurgist and mining engineer for *Sunshine Mining Company* in Idaho, has left that position to become general manager of the Mohawk project. Sunshine investigated the Mohawk in 1953 on a purchase option, but relinquished it because results were not sufficiently encouraging for them.

E. L. Cord of Fish Lake Valley, Nevada has taken an option of uranium claims straddling the California-Nevada border, partly in Lassen County, California. The district is reported to be in an early stage of development. Total price if the option is exercised could total $780,000, according to Mr. Cord.

Eldorado Uranium Corporation of Austin, Nevada has started extensive diamond drilling on its 30 claims in Lander County. The firm plans to concentrate on uranium and vanadium, but does not restrict itself exclusively to these minerals. The property lies about three miles south of Austin. Theodore K. Young is president.

The *Western Uranium Corporation* of Reno, Nevada has entered into an operating agreement with the *Gold Metals Corporation* whereby Western Uranium will prospect and develop the *Nighthawk* property in the Belmont area. The Nighthawk was the original uranium discovery in the district and reportedly has a showing of high-grade stringers exposed on the surface across a width of 30 feet and a length of 185 feet. A diamond drill program has been laid out to prospect the ground. Western Uranium purchased eight claims known as

the *Eagle* group in this same district not too long ago. Herman E. Smith of Reno is president.

The *Minerva* mine in southern White Pine County, Nevada is now shipping tungsten ore to the old Baltimore-Camas mill at Ely, Nevada, at the rate of about 50 tons per day. *Combined Metals Reduction Company*, operator of the Minerva, was shipping the ore to Bauer, Utah, but switched to Ely when *Minerals Engineering Company* of Grand Junction, Colorado took over the mill. (See MINING WORLD, January 1955, page 85.) The Minerva is presently being operated on two shifts per day.

Ernie Leidig, president of the *Union Mineral and Chemical Company* of Los Angeles, and G. J. Greenwood and associates have purchased 40 claims northwest of Tonopah, Nevada from Tom McCulloch for their uranium potential. Mr. Greenwood will be in charge of local operations, and experimental drilling will start immediately.

Neva-Utex Uranium, Inc. has been formed at Goldfield, Nevada. The firm has leased 27 claims in the Sonoma mining district six miles south of Winnemucca, Nevada which are reported to show high radiometric anomalies. Core drilling will start under the direction of Monty Lynch, geologist. Scott Hockensmith is president of the new firm.

At Winnemucca, Nevada, the *Thacker Pass Mining and Development Corporation* has been organized to mine, mill, and market all types of minerals and metals, in addition to acquiring and operating mining property development. Directors are: Donald Eby, Harlan Phipps, all of Orovada; Glen Roysdon of Laurel, Montana; Ward and Isabelle King of Greybull, Wyoming. The firm has already started to diamond drill nine uranium claims known as the *Black Canyon* group in Kings River Valley, 65 miles north of Winnemucca, and holds a total of 31 claims in that area.

NEW MEXICO

The *Four Corners Uranium Corporation* of Denver, Colorado has acquired properties of the *Largo Uranium Corporation* and the *General Uranium Corporation* of New Mexico, including 480 acres of land adjacent to Fort Wingate, one of the nation's ordnance depots, near Gallup, McKinley County. E. H. Sanders of Denver, president of Four Corners, has announced plans for immediate exploratory work.

Victory Mining & Exploration Company has begun mining operations at a site between Farmington and Shiprock in San Juan County, New Mexico. Samples tested 0.18 percent uranium and 0.03 percent vanadium at the Shiprock test office of the AEC, Miss Clara Lisetor-Lane, president of the company, announced.

International Minerals & Chemical Corporation has put into operation a new Model 1-PM mining machine at its potash mine in the Carlsbad district, New Mexico, said to be the first continuous miner in the area specifically designed to meet the problems peculiar to potash ores. Two others already in use are adaptations of machines designed for coal mining. Model 1 Potash Miner weighs 24½ tons (5 tons heavier than the older models) and has 40 more horsepower. Its 42-inch head bites 18 inches into the face and cuts up to 7½ feet high. The cutting head can be swung both ways to cut a face 17½ feet wide from one setting.

The New Mexico Land Office advisory board has approved an attempt to obtain legislation to clarify the present mining laws of the state and validate millions of dollars of improvements on state lands for which no record of land office authorization appears to exist. State Land Commissioner E. S. Walker explained that since the founding of the land office, leaseholders had placed improvements on the lands with little or no formal permission. The proposed clarified law would cover leasing of state mineral properties for all minerals not covered by specific legislation, including uranium, and would do away with the distinction between lode and placer as defined in the 1912 law. It would place all leases on the basis of legal subdivisions of 40 acres or multiples thereof, with no lease to be larger than 640 acres.

The ninth annual meeting of the *New Mexico Geological Society* is tentatively planned for the weekend of April 29, 30,

and May 1. The meeting this year will be in Gallup and will include a uranium field trip on May 1 through the Grants area. For further information write to the Society at P.O. Box 219, Albuquerque, New Mexico.

Lamar Fleming, Jr. and W. Stuart Boyle of Houston, Texas have leased a 116,000-acre San Diego land grant in central New Mexico from the *New Mexico Timber Company* of Albuquerque. An aerial survey program has started and this will be followed by core drilling in the spring. Under the lease, they will pay $12,500 for prospecting rights, a bonus of $150,000, and $25,000 annual rental for 10 years. The timber company retains a sliding scale royalty on uranium; a 12.5 percent override on oil and gas; and 50 cents per ton royalty on sulphur. Mr. Fleming and Mr. Boyle also have an option to buy.

The *Western Development Company* plans to reopen the abandoned Cerrillos lead-zinc mining district south of Santa Fe, New Mexico. The firm has also taken exclusive mining and prospecting rights on 17,000 acres south of the district, and plans to build a mill for processing lead and zinc ores instead of shipping to El Paso, Texas. The firm hopes to open the non-ferrous mines this summer.

The *United States Smelting, Refining & Mining Company* will close its *Bullfrog* mine in Grant County, New Mexico because of the uncertain outlook of the zinc market. The mine has been on a stand-by basis for several months, and the firm has now decided to reduce maintenance expenses by removing the pumps. J. T. Lewis, Jr., manager, will be transferred to Salt Lake City.

Uranium highlights the New Mexican mining news, too. On the outskirts of Farmington just off the Bloomfield highway, *Monarch Drilling and Exploration Company* is core drilling for uranium. Plans call for drilling to a depth of 200 to 300 feet. The work is being done on a federal claim for *W. J. Spears & Associates* of Beaumont, Texas. Twelve miles southwest of Silver City, a bed of uranium ore is said to have been located by the *Tunuco Mining & Exploration Company*. In the Rocky Arroyo and Walts Canyon areas, the *Woodson Producing Company* and C. Deeley of Dallas have started core drilling for a group of mine claim holders. They hope to prove that commercially valuable deposits of uranium and thorium exist there. The claim group assigned one-half interest in uranium, thorium, and all other minerals except gas and oil and other liquid hydrocarbons that might be developed. Also a 12½ percent override royalty on all minerals produced was reserved by each assignor.

Roy Ikes of Vernon, Texas, and Joe Corbine of Wichita Falls, Texas, have purchased a half interest in 22 uranium claims on the east slope of Ladron Peak, 30 miles south of Belen, New Mexico from Mrs. Hattie Jeter and her daughter, Bobbie June Lawson. The remaining half belongs to Bryan Hoff of Fort Worth. The claims cover 420 acres.

The first commercial uranium ore in Texas is reported to have been found on the ranch of Mrs. T. E. McArthur near Spur, Texas. A shipment by Mrs. McArthur's four sons to the AEC uranium plant at Bluewater, New Mexico operated by the *Anaconda Copper Mining Company* confirmed the uranium content of 30 pounds of sandstone outcropping.

The *Texas and Southwestern Cattle Raisers Association* will ask the Texas state legislature for a law providing ranchers who bought state land with the same rights for uranium and other minerals that they now own on oil and gas. The action was prompted by a rash of prospectors who have been exploring land on which ranchers own surface rights but on which mineral rights were reserved by the state. According to law, the prospectors can hunt uranium without asking the landowner's permission.

The *Dow Chemical Company* has renewed for three years its lease on the government-owned magnesium plant at Velasco, Texas. The company acted upon the renewal option in its present lease and at the same time withdrew its offer to buy the plant.

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New Rainbow Mining Company recently made initial shipments of crude ore from the old *Weber* mine near Lakeview, Bonner County, Idaho. The ore, averaging about 22 ounces of silver, 0.06 of an ounce of gold, 2 percent lead, and 3.5 percent zinc, was shipped to the Tacoma smelter of American Smelting and Refining Company. Treatment charge was only $1.29 a ton because of the high silica content (64 percent), which is a desirable material in the copper smelter operation. The ore came from a raise from the No. 4 tunnel level. Robert B. Austin of Wallace is president and manager.

Mascot Mines, Inc. is planning a limited development program at its *Little Pittsburgh* mine in Shoshone County, Idaho's Pine Creek zinc-lead district. Intersection of the main vein on the new No. 10 level is the goal. Low prices for base metals caused suspension of operations after a station had been cut at the level. Claude Nugent of Kellogg is president.

At the *Vindicator Silver-Lead Company* property east of Mullan, Shoshone County, Idaho, miners are drifting along a fissure vein cut in driving a 280-foot crosscut through a shear zone from the shaft station on the new 750-foot level. Where intersected at the 210-foot point, the vein was a foot wide and contained some sulphides. The crosscut also intersected several stringers of lead-silver mineralization. The work is being done by *Silver Buckle Mining Company*, Wallace, with aid of a DMEA loan. Gale Hansen is superintendent.

Idaho Custer Mines, Inc., at last report, was making improvements to its flotation concentrator at the *Livingston* mine near Mackay, Custer County, Idaho. Meanwhile ore was being stockpiled from leasing operations. Plans call for milling about 18,000 tons of lead-silver-zinc ore this year. Sinking of a 450-foot incline shaft in the footwall of the Livingstone vein is planned under an amended contract with the Defense Minerals Exploration Administration.

Clayton Silver Mines is mining 100 tons of lead-silver-zinc ore daily at its Custer County, Idaho property and has stockpiled more than 1,000 tons of zinc concentrates. Production is mostly from above the 400-foot level. Ore was found sooner than expected in tunneling toward the South ore body on the new 500-foot level. Norman Smith is operating engineer.

High-grade lead-silver ore has been opened in the *United Idaho* mine at Gilmore, Lemhi County, Idaho by lessees Ronald and Arthur Henderson of Gilmore and Charles Plum of Leadore. First 50-ton shipment grossed $3,365.

Highland-Surprise Consolidated Mining Company has taken lease and purchase options on three adjacent mining properties in Fourth of July Canyon, Custer County, near Stanley, Idaho, and has staked some adjoining ground and a mill site. Surface bulldozing and diamond drilling have shown very encouraging lead-zinc-silver mineralization and underground development work is scheduled to start in the spring. At the firm's zinc-lead mine on Pine Creek in the Coeur d'Alene mining region, Shoshone County, lower levels are being abandoned and rails and other equipment removed. Lessees are continuing to extract ore remaining in upper levels. At the company's 29-claim uranium prospect in the Henry Mountains area, Garfield County, Utah, drilling was scheduled to start in January. Frank J. Luedke, Spokane, is president, and Timor Klobusicky, superintendent.

Additional pumping facilities have been installed in the *Whitedelf* mine near Clark Fork, Idaho, to handle a heavy water flow encountered in tunneling southerly from the 800-level shaft station. Compton I. White is secretary-treasurer of *Whitedelf Mining and Development Company*.

Progressing on schedule is the report of the *San Francisco Chemical Company* on its work at the *Carthage* project of *Stauffer Chemical Company* at North Lake in the Hot Springs Range, Idaho. San Francisco Chemical is prime contractor for Stauffer in this operation. An 8½-foot crosscut has been driven through solid limestone a distance of about 800 feet since June 10, 1954. Intersection with the phosphate-bearing structure is expected within the next 900 feet of advance to be completed about April 1. A new mine plant has been installed.

Some gravity concentrating tables from the old *Yellow Jacket* mill have been loaned to *Calera Mining Company* at Cobalt, Idaho for experimental work in the *Blackbird* mill. The tables are being installed in the hope that they will pick up escaping concentrate. The Yellow Jacket, located near the Blackbird operation, was once an active mining operation in Lemhi County but has been lying idle for some years.

Exploratory drilling for uranium in Idaho County's Red River district is proposed by *Lewis-Clark Uranium Co., Inc.*, of Kamiah, Idaho, which has located 11 claims in the area. James Danielsen is president and R. L. Amsbary, secretary-treasurer.

Before shipping operations were suspended for the winter at the *Gay* mine of *J. R. Simplot Company* near Fort Hall, Idaho, approximately 607,000 tons of phosphatic shale and high-grade ore had been mined last year. As long as weather permits, stripping operations for the new season's mining will continue. At the remodeled Simplot triple superphosphate plant near Pocatello, an initial run has been made to test the new boiler and evaporator. Modifications and expansions of this plant are about completed, and a new production capacity in excess of 100,000 tons of high analysis fertilizer is now expected annually.

Camas Uranium Mining and Development Company, recently organized at Fairfield, Idaho, owns 20 mining claims in the Little Smoky mining district of Camas County, Idaho, north of Fairfield. Gold, silver, lead, and some indications of radioactivity are said to be present. The firm plans to open an old tunnel on the property during the coming season to determine the full amount of radioactive ore. Sterling W. Stoker has been elected president of the firm, with Donald F. Vaught, vice president, and Lowell Fields, secretary and treasurer.

A silver-gold vein opened by *North Fork Mining Company* at its leased *Lucky Strike* property near Kings Pass, north of Wallace, Idaho, has been found to contain pitchblende mineralization. The ore is similar to that found several

Old Stevens County Mine and Mill Producing Again

The old Deer Trail silver concentrator near Fruitland, Stevens County, Washington (shown above) has been renovated, enlarged, and reequipped for production of copper and cobalt by Alpine Uranium Corporation of Salt Lake City at a cost of about $60,000. Dump ore is being processed and concentrate shipped to the Tacoma smelter of the American Smelting and Refining Company. Alpine has started production at the old Turk copper-cobalt mine nearby, which it is operating on assignment from Triumph Uranium & Oil Company. Triumph is associated with Alpine in a number of enterprises, and holds the property under perpetual lease from Three Peaks Mining Company, also of Salt Lake. The Deer Trail plant will process ore from the Turk property and some custom milling is also planned. See *Mining World*, October 1954, page 82 for earlier details of the operation.

years ago deep in the *Sunshine* mine in the silver belt west of Wallace but said to be sub-commercial. The pitchblende is associated with reddish jasperite and pyrite. Drifting along the vein and diamond drilling below it are planned. L. S. Edwards of Lewiston, Idaho is president.

The *Red Leaf* property in Blaine County, Idaho will be explored for lead and zinc by E. H. Sowers and Stanley G. Johnson of Hailey under a $10,662 DMEA contract. Both underground crosscutting and drifting are planned.

MONTANA

A surface tungsten deposit south of the old *Hope* mine near Philipsburg, Montana, is to be mined by strip methods, according to plans of a newly formed Spokane, Washington firm, *Solar Corporation*. Copper veins also have been uncovered on the property. Tentative arrangements have been made for milling at Philipsburg. Fred E. Younker is president and Carl C. Schreiner, vice president.

Boss Mines, Inc. at Helena, Montana has received DMEA approval for a $26,146 lead-zinc exploration project in Cascade County. B. W. Hewitt is president.

The Defense Minerals Exploration Administration has approved a $26,110 lead-zinc-copper exploration project by *Elkhorn Consolidated, Inc.* in Jefferson County, Montana. John M. Learell of Helena is president, and Paul M. Smith of Helena, secretary.

Montana Mineral Development Company of Glendive, Montana has been capitalized for $50,000. Directors include Richard Busfield, of Belle Fourche, South Dakota; Philip Hamm and George C. Johnson, both of Glendive.

The *Permo Exploration Company* has been incorporated at Nye, Montana by E. S. Rugg, John R. Mullen, John Egan, Louis Psenda, and T. P. Mulvihill Jr. who now serve as directors. Also active in organizing the group were Guy Morris and George Bailey. The company is equipped to do its own engineering and geological work, including making airborne radiation surveys for uranium. In addition to carrying on a continuous exploration program of its own, the company is available for examination work. The firm does not plan to concentrate on any one type of mineral deposit.

William G. Mouat and Charles I. Kolstad of Billings, Montana; James Burrows, Reed Point; Raymond Rudd, Big Timber, and R. N. Lutes, Louisville, Kentucky, have incorporated *Half Moon Mining Co., Inc.*, with $50,000 capital.

The old *Little Ben* mine in Montana's Little Rocky Mountains has yielded a new deposit of gold ore 50 feet wide and at least 200 feet long. Discovered in 1890 and abandoned in 1942 after a $6,000,000 production record, the mine was acquired recently by *Little Rockies Mining and Development Company*. Frank Bryant of Malta is president.

Hamilton Mines, Inc. has been incorporated by three Lennep, Montana men, George Voldseth, Paul V. Grande and Clarence Hereim, with capital of $50,000.

Valley Mining Company has been organized at Deer Lodge, Montana with 5000 shares of no-par stock. Directors are Clifford G. Hendricks and L. E. Fonteine, both of Milwaukee, Wisconsin; George Brys, Drummond, Montana, and E. A. Kletzien, Menomonee Falls, Wisconsin.

Amador Mining Company has closed down its *Amador* copper mine, formerly the *Green Mountain* mine, located six miles west of Dixon, Montana. The lower level development program apparently did not come up to expectations.

The United States Geological Survey has recently designated the Montana Bureau of Mines and Geology as an authorized map agent for the distribution of topographic and geologic maps of the State of Montana. Available for free distribution are a limited number of "Index to Topographic Mapping in Montana." Copies of these may be secured by writing to the Office of the Director, Montana Bureau of Mines and Geology, Montana School of Mines, Butte, Montana. The Montana Bureau of Mines and Geology is one of few such agencies established by the U. S. G. S. for map distribution. Maps will be sold at cost. The Montana Bureau of Mines and Geology has received a complete set of all topographic

maps of Montana except for those which are out of print.

Montana Phosphate Products Company of Garrison, Montana has leased 560 acres of government land six miles west of Avon, Powell County, for phosphate production.

OREGON

The *Canyon Creek Mining Company* of Prineville, Oregon has leased the Herschoff furnace on *Ochoco Mining Company's* property in Crook County, Oregon to test ore from the *Mother Lode* quicksilver mine. The Canyon Creek company is a partnership of Frank Reid and associates.

National Industrial Products Corporation is producing about 15 railroad cars (about 825 tons) of limestone daily at its quarry in Durkee, Baker County, Oregon. The permanent crushing and processing facilities, recently completed, consist of three main units—a primary crusher, secondary crusher, and a third unit for production of special sizes of limestone. A recently constructed railroad spur and siding have sufficient capacity for at least 20 carloads per day. The deposit covers an 820-acre tract. Bulk of the output goes to sugar and paper mills. Ted Lewandowski is superintendent, and A. L. Heward, office manager.

WASHINGTON

More than 16,000 acres of state lands adjacent to the Spokane Indian Reservation had been filed on for mineral leases at last report of the state land office. *Midnite Mines, Inc.*, which started the land leasing rush by shipping 200 tons of uranium-bearing ore, has resumed production after being notified the initial shipment would test at least 0.30 percent uranium oxide. The property was inspected recently by George B. Guillotte, consulting mining engineer for *Continental Uranium, Inc.* of Chicago. Members of the Spokane tribe of Indians have filed for prospecting permits on about 75,000 acres of tribal lands.

The old *Electric Point* mine in northeastern Stevens County, Washington, has been purchased by *Northwest Mining Syndicate* of Spokane, headed by Fred M. Viles. In the last two years, *Harris & Bumgarner*, mining contracting firm of Northport, did considerable rehabilitation and exploration work at the property for *State Mining Company*, and shipped a small amount of crude lead ore. The mine yielded high-grade ore from chimneys between 1916 and 1921.

At the adjacent property of *Gladstone Mountain Mining Company*, A. G. Lotze of Northport, Washington, is sinking a new two-compartment shaft under a new two-year lease. Lateral work to explore a known ore chimney is planned from about the 150-foot depth. A 200-foot shaft dug by Lotze in 1953 yielded some crude ore assaying 60 to 70 percent lead, similar to that mined in substantial quantities in the 1920s.

Luke Bayley has been reelected president of *Spokane Molybdenum Mines, Inc.* which has holdings in northern Lincoln County, Washington.

Northwest Refining and Chemical Company has signed a contract with *General Machinery Company* to erect a 40- by 100-foot prefabricated steel and aluminum building in the Spokane Valley, Washington to house a proposed zinc oxide and chemical fertilizer plant. Barnard Wilcox of Spokane is president.

Uranium Enterprises has been organized by Stanley O. Leland and Roland C. Bartlett, Spokane, Washington business men who fly and prospect as hobbies. They organized the firm to carry on aerial and ground exploration for uranium and to manufacture Geiger counters and scintillators. At last report they had staked a group of claims in northern Nevada.

New Jersey Lead Mines, Inc. of Spokane, Washington inactive since 1950, is looking for a promising uranium prospect. An assessment of ½-cent a share has been levied on the firm's outstanding 3,881,908 shares. The company spent more than $43,000 on the Carbonate mine at Marysville, Montana between 1947 and 1950 before abandoning it. Also unsuccessful was a $395,000 previous attempt to make a mine out of a property in the Pine Creek district near Kellogg, Idaho. J. B. Phillips, Spokane, is secretary-treasurer.

Hecla Mining Radon Claims In Agreement with U. & I.

Hecla Mining Company, long-time Idaho lead-zinc producer, has undertaken the mining of a major uranium ore body which was diamond drilled by U. & I. Uranium, Inc. on the 10-claim Radon property in the Big Indian district, San Juan County, Utah. A shaft will be sunk about 700 feet to reach an ore bed more than 2,000 feet long containing a probable 200,000 tons of good grade uranium ore.

Under the operating agreement with U. & I., Hecla also will take over exploration and development of the adjoining 35-claim Hot Rock property. Any other properties acquired by U. & I. also will be operated by Hecla on a profit-sharing basis if it so elects. Hecla has reimbursed U. & I. for nearly $100,000 spent on the Radon and will reimburse it for $82,000 spent on the Hot Rock.

U. & I. already has started prospecting 28,000 acres acquired in San Juan County's White Canyon area. Exempted from the arrangement is the Rocket group of 20 claims in Grand County's Bull Canyon area. U. & I. previously built an access road to the property and plans to drill there this spring.

Subsidiary to Take Over Vitro Wyoming Operations

A subsidiary operation, Vitro Minerals Corporation, has been formed by Vitro Corporation of America, New York, and Rochester & Pittsburgh Coal Company, Indiana, Pennsylvania.

The new firm will conduct mining operations in Fremont County, Wyoming, including the Gunnell and other claims which were purchased by Vitro from Sateco Uranium Company, and will take over other uranium properties previously held by Vitro Uranium Company, a Salt Lake City, Utah division of Vitro Corporation.

Open-pit mining and exploration work on the Sateco leases have started. The 57 claims, from which ore has already been shipped, are located near the Lucky Mc property in Fremont County's Gas Hills area. Other uranium ore interests included in the new firm's holdings are claims near the San Rafael Swell district of east central Utah, including the Daye-Davis and Desert Queen claims and a nearby school section, and property in the Blind River district of northern Ontario, Canada.

Vitro Corporation and Rochester each hold a 50 percent interest in the subsidiary. Jack O. Horton, manager of the ore department of Vitro Uranium Company in Salt Lake City, was named general manager of Vitro Minerals.

Utah Uranium Companies Continue Merger Trend

Mergers and rumors of mergers highlighted the Utah uranium scene during January and February, with the largest transaction involving Floyd B. Odlum's Federal Uranium Corporation, which has announced the absorption of five producing uranium firms on the Colorado Plateau.

Merged into the new Federal Uranium Corporation, a Nevada-chartered firm, are the old Federal group, Kentucky-Utah Mining Company, Howell Mining Company, Interstate Uranium, Inc., Western State Uranium, Inc., and Utida Uranium, Inc., all of Salt Lake City, Utah. Last December the properties of the W. L. Davidson Syndicate, Albuquerque, New Mexico, were absorbed by Federal. This latest move makes the new Federal Uranium Corporation the largest uranium firm in the United States, from the standpoint of claim ownership and indicated and proved ore reserves.

Uranium Corporation of America, Salt Lake City, has also announced merger plans involving Lost Dutchman Uranium Mining Corporation, Fortune Uranium Mines, Inc., Chief Ute Uranium, Inc., and Uranium Refining & Mining Company.

Other firms reportedly considering merger plans are Atomic Uranium, Inc., Redman Uranium Company, and Utah National Uranium Mining Corporation, with Utah National as the surviving firm, and Utah-Vernal Oil and Uranium Company, in a consolidation which may involve 10 to 12 other Utah uranium companies.

Standard Uranium Begins Production at Big Buck

Production began at Standard Uranium Corporation's Big Buck claims in San Juan County, Utah, late in January, and, according to a special report by mining consultant Charles Will Wright of Washington, D.C., a monthly production of 12,000 tons of ore is expected by the firm by May of this year.

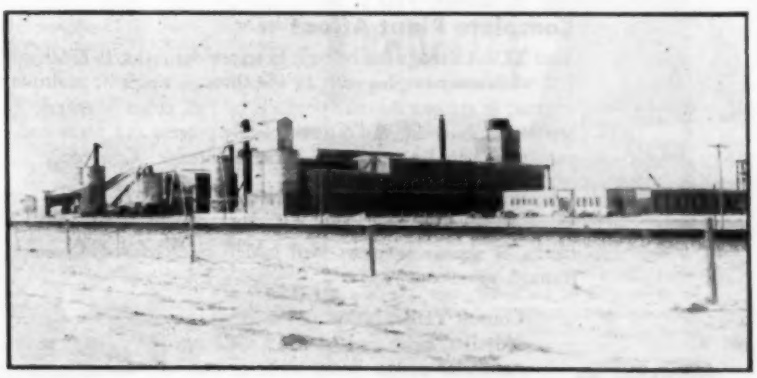
Mining of the ore bed was started around the collar of a 90-foot raise which was completed in January. Initial mining of the ore was by Jack-leg drills. The blasted ore was moved to the raise by slushers. Later plans call for the use of two drill Jumbos and a Gismo machine (See MINING WORLD, February 1955, page 62.) Although development of the mine was delayed nearly a month by machinery breakdowns and delays in securing new equipment, operations are now running smoothly and production estimates are as follows: March, 6,000 tons of ore; April, 10,000 tons; May, 12,000 tons.

COLORADO

Cherokee-Utah Uranium Company is having a 435-foot shaft sunk on its Beaver Mesa properties above Gateway, Colorado, in order to reach the lower member of the Saltwash Formation where cores have assayed an average of 0.44 percent uranium and 3.0 percent vanadium. The two-compartment shaft will be the third deepest on the Colorado Plateau. Deepest shaft is that of *Golden Cycle Corporation*, Colorado, and second deepest is the La Sal Shaft, *Homestake Mining Company*, Utah. (See "Uranium Mining Goes Deeper," MINING WORLD, December 1954, page 40, for a detailed description of deep shaft operations on the Plateau.) *American Uranium Engineering Company*, Grand Junction, Colorado, has a contract to sink the shaft and mine the ore. The shaft is expected to be completed by April 1. Robert E. Simpson, chief engineer for the engineering firm, is in charge of operations.

Legal action is pending to clear the title to uranium claims in the Holy Cross mining district, 21 miles from Red Cliff, Colorado, which was announced by Edwin Arbar, Jr., Western State College student late last year (See MINING WORLD, January 1955, page 87.) *Edwards Mining & Exploration Company, Inc.*, Denver, Colorado has stated that the property was located, staked, and discovery work completed by the firm and that Mr. Arbar filed amended location certificates on the claims.

United States Lithium Company's mill 26 miles from Gunnison, Colorado is expected to begin operations within the next few months. Additional classifiers have been installed at the plant, and the



Former Government Plant Being Converted

Conversion work is now underway at the former government experimental alumina plant at Laramie, Wyoming (pictured above) which was purchased late last year by Great Western Aggregates, Inc. of Denver, Colorado. The firm, a subsidiary of Ideal Cement Company, will use the facilities to make a lightweight aggregate product, which will be marketed on the Colorado Plateau, in Nebraska, and in parts of Minnesota. The firm will employ 60 men at the outset of operations with a working force of 100 expected when production reaches 800 cubic yards per day. Great Western paid the General Services Administration $1,200,000 for the Laramie plant.

ROCKY MOUNTAIN

nearby *Brown Derby* lithium mine is being renovated. The mine formerly was owned and operated by *Poston Mining Company* and was purchased by U.S. Lithium last fall.

General Minerals Corporation, Chicago, Illinois, has purchased the lead mining properties of Ellis Lupton, Clear Creek County, Colorado and has announced plans to construct new mill facilities near the property. *Stearns-Roger Manufacturing Company* has been negotiating with the firm on proposed expansion of the Commonwealth mill near Georgetown. The Lupton properties, known as the *Grizzley* group, comprise approximately 60 acres. The lead mines have been worked on a moderate scale for several years. The new owners expect to put to work a crew of 80 men in the next few months.

Jim Provo, Denver, Colorado school custodian, reportedly has been offered $1,000,000 for his Gunnison, Colorado uranium claims. A weekend prospector, Mr. Provo and his brother-in-law, H. M. Christ, staked 130 claims in the mountain area between Gunnison and Saguache. Geologists inspecting the claims have rated them in the million-dollar class, according to Mr. Provo.

Burke-Martin Mines, Inc., Montezuma, Colorado has reported a rich strike of silver ore in the recently reopened *Silver Wing* tunnel six miles southwest of Montezuma. The firm began expanding operations last summer when development work showed mineralization. Samplings of the vein which has been opened along a 70-foot tunnel show ore three feet in width, carrying silver, gold, and lead. The ore is scheduled to be hauled to the *American Smelting and Refining Company* smelter near Leadville. Operations are under the direction of Tom E. Martin, vice president.

Also from the Montezuma, Colorado district comes a report of the formation of *Montezuma Uranium, Inc.* The firm was organized after radioactivity was discovered at the *Orphan Boy* mine. A trial shipment of the radioactive material prompted formation of the company, and all local mine owners have contracted to participate. Base of operations are the *Chataque* mines operated by Pat and Mike Vinson and Fred Harris and some of the *Burke-Martin* holdings. The company has acquired the Toledo mill owned by Chataque mines.

Hecla Mining Company, Wallace, Idaho firm, has opened an office in Grand Junction, Colorado. In charge is J. D. Bell, resident engineer, who reports that Hecla is examining uranium properties and planning exploration.

SOUTH DAKOTA

Moab Uranium Company has sold 22 claims to *Rosebud Oils, Inc.* of Huron, South Dakota. The oil firm has extensive holdings in Wyoming, and executive vice president A. R. Barnes and associates have numerous uranium claims near Edgemont, South Dakota, known as the *McLeod Mining Company*, from which 60 tons of ore per day are being shipped.

The 22 Moab claims are located on Chinle-Shinarump strata in the Moab mining district, and the Rosebud firm is planning to undertake a mining program on the property immediately.

Inspiration Lead Company, Inc., Spokane, Washington, has shipped its first truckloads of uranium-vanadium ore from its eight-claim property in San Juan County, Utah. Production is from a tunnel into Morrison formation. Long-hole drilling into the walls and surface down-hole drilling is programmed. W. H. Simons, former Idaho state mine inspector, is resident engineer-manager; R. R. Weideman, general superintendent. Ernest H. Carlson, Spokane, is president of the firm.

Production figures for the *Utah Copper Division* of *Kennecott Copper Corporation* during 1954 have been announced by the firm. Copper ore mined and milled totaled 24,080,000 tons; this was 5,843,000 tons less than the 1953 figure. Waste material removed was 35,857,000 tons. In addition to copper, the company produced 22,300,000 pounds of molybdenite.

A five-foot ore zone was indicated by logging of hole No. 1 drilled on the Grand County, Utah property of *Idaho Goldfields, Inc.* and *Spokalta Petroleum*, both of Spokane, Washington. The radioactive zone was found at 240 feet in the Brushy Basin member of the Morrison sandstone. Additional drilling is planned. L. A. Thompson is president of Idaho Goldfields. Max A. Day is consulting geologist.

Calunite Company and *Rocky Mountain Mining & Development Company* have begun shipments of alunite ore from the Marysvale, Utah mining district. The ores, which contain up to 20 percent sulphur and 16 percent potash, are being used in California as fertilizers. Calunite is producing approximately 60 tons a day.

Sabre Uranium Corporation, Grand Junction, Colorado has announced an additional exploration program on its *Lucky Strike* claims in Utah from which a reported 2,500 tons of uranium ore were mined in 1953 and 1954. The company recently purchased a Cessna 180 airplane for use by its engineers and geologists in supervising work on the Colorado Plateau. Sabre has a total of 775 claims, including property in Colorado's Bull Canyon area which has indicated the presence of commercial mineralization.

Amuranium Corporation, with offices in Moab, Utah and Washington, D.C., has received a $147,650 loan from the Defense Minerals Exploration Administration for drilling and geological work on the firm's Utah properties. The company is now producing uranium ore at its New Mexico operations.

American Uranium Corporation, Moab, Utah, is drilling 59 core holes on its properties on the Colorado Plateau. In addition to owning 29 properties, the company has contract right to purchase 36 others. *Pioneer Drilling Company* of Midland, Texas is drilling for the firm on the following groups: *Cottonwood Canyon*, San Juan County, Utah, 10 holes; *East Coyote Wash* group, San Juan County, Utah, 12 holes; *North Coyote Wash* group, 9 holes; *Sinbad Ridge*, Utah-Colorado, 28 holes.

Geronimo Uranium Mining Corporation Salt Lake City, Utah, reports that drilling on the *Eagle* group of claims in the La Sal Creek area of Utah has indicated an ore body 350 feet long and 60 to 70 feet in width. Drill holes show the ore body is 6 feet thick. The ore has been assayed at an average of 0.33 percent uranium and 1.50 percent vanadium. The firm also has claims in the Slick Rock district of Colorado.

Eighty-eight uranium claims on Little Pinto Mesa, eastern Utah, reportedly have been leased to *The Eagle-Picher Company* by four Utah men under the name of *Los Cuartos Company*. Eagle-Picher now has a $60,000 rig on the property and is conducting drilling operations under the supervision of Dolph Fieldman. The Los Quartos group holds some 33 other claims in the area under the name of *Somos Ricos Mines, Inc.*

Two important zinc-lead producers of Shoshone County, Idaho, *Sidney Mining Company* and *Mascot Mines, Inc.*, have joined forces to explore and develop a 36-claim uranium prospect in Utah's Thompson mining district and the nine-claim *Alto* group in Colorado's Gateway mining district. The larger *Sand Flat* group is in an unexplored area of the Morrison sandstone formation, midway between the Yellow Cat and Gateway districts. Geiger counter readings have indicated several potential ore-bearing horizons. Preliminary drilling already has been started by Mascot, which is acting as operating company in the venture, on the Sand Flat group. Contract for diamond drilling has been let to *Sprague and Henwood, Inc.*, Grand Junction, Colorado. Costs and profits of the venture will be shared equally by Mascot and Sidney. President of Sidney is Malcolm C. Brown, Kellogg, Idaho. Robert E. Brown, also of Kellogg, heads Mascot.

The *United States Atomic Energy Commission's* new ore-buying station and sampling plant at Moab, Utah began receiving ore February 1. The plant, operated for the AEC by the *American Smelting & Refining Company*, handles uranium-bearing carnotite and roscoelite ores. The new plant replaces a provisional ore-buying station which was set up May 1954 to reduce the load on the AEC's Monticello, Utah plant.

Kennecott Copper Corporation has added 500 workmen to its Utah operations payroll with the intention of increasing copper production by 6,000,000 pounds per month. The expansion, affecting the *Bingham Canyon* mine and the Arthur and Magna mills, boosts Kennecott's Utah payroll to 6,000 men. The division has completed a four and one-half mile long, 12-inch pipe around the south and east sides of its eight-square-mile tailings pond at the Arthur and Magna mills. The pipe will divert part of the flow of coarse tailings from the mills to the northeast section of the pond, where they will be released against the northeast dyke wall to prevent seepage. Most of the tailings from both mills will continue to be discharged on the south end of the pond.

National Uranium Corporation of Wallace, Idaho has agreed to test drill the

Mountain Lion No. 18 and *19* claims in the Big Indian Wash area of San Juan County, Utah, under a profit-sharing contract with *Silver Buckle Mining Company*, Wallace, Idaho. The firm has been drilling other Silver Buckle claims in the area.

Nabob Silver-Lead Company and *Merger Mines Corporation*, Idaho firms, have announced a joint Colorado Plateau uranium venture. The firms have taken a 10-year lease and purchase option on 10 claims covering an outcropping of uranium ore in northeastern Utah. Nabob manager Clarence C. Dunkle and C. H. Hunter, president of Merger, flew over the property in a scintillometer-equipped plane and reported favorable readings over a 1,500-foot outcropping. A down payment of $10,000 was made on the $60,000 purchase price of the claims. The remainder is to be paid out of royalties.

Security Uranium Service, Inc. at Moab, Utah, has completed its new $50,000 office building and equipment. The firm, with offices also in Provo, Utah, owns or controls more than 3,500 uranium mining claims and 35 sections of school land in Utah and Arizona. Its services include geological reports, surveys, engineering data, map service, and assay reports.

Magic Valley Uranium Company, Hailey, Idaho, is developing a uranium vein on a 10-claim property in Utah's Temple Mountain area. The company also has a six-claim property in Camas County, Idaho, and 640 acres on state-leased land in Emery County, Utah. S. W. Stoker of Hailey and his sons, Robert and William, organized the firm.

WYOMING

Mountain Mesa Uranium Corporation, Casper, Wyoming, is shipping ore to the new AEC buying station in Riverton from its property near Puddle Springs. The firm recently moved in an air compressor to aid workmen in the digging of blast holes through the frosty surface of the *Blarco* claims, owned by several Lander residents and sold to the company. Ralph H. Thurston is general manager.

Formation of the *Uranium Ore Reduction Company* in Fremont County, Wyoming was announced last month. The company, with headquarters in Lander, has received commitments from holders of several hundred claims in the Gas Hills area for milling rights. The company plans to establish a plant for reduction, smelting and refining uranium ore at Riverton and has made application to the Atomic Energy Commission for approval to establish the mill.

Arrow Uranium Corporation, a Utah-based firm, has secured a number of uranium claims in Sweetwater and Fremont counties, Wyoming, from Jacob K. Booth, Lander, Wyoming, for a reported $35,000. The *Sweetwater* claims, located on Red Desert, are believed to be the first claims in the county to have been sold since the uranium rush started in the area more than a year ago. A bed of sandstone, 80 feet thick in places, has been discovered on the property, and uranium content running from 0.5 to 1.0 percent U_3O_8 is reported.

Purchase of 100 uranium claims in Fremont County, Wyoming, has been announced by the *McAlester Fuel Company*, McAlester, Oklahoma. Located in the Gas Hills area about 55 miles southeast of Riverton, the claims were sold by Sam Day, Fort Collins, Colorado, uranium and oil man. In addition to the claims purchased from Mr. Day, the firm has filed 63 other claims in the county and holds several uranium claims in eastern Utah.

British-Western American Uranium Corporation, with offices in Denver, Colorado and London, England, has announced the purchase of uranium mining contracts and leases in Fremont County, Wyoming for more than $75,000 in cash and royalties. The properties were bought from a local mining syndicate which included *Juneau Uranium Corporation*, *Niagara Uranium Corporation*, *Mohawk Uranium Corporation* and *Lander Mining and Uranium Company*. The mines, which are located near the *Upecto*, *Lucky Mc*, and *Green River* uranium operations, have a reported value of $30,000,000. British-Western, under the direction of George C. Heikes, executive vice president, plans a stepped-up program for the mines.

Deadwood Gulch

(Continued from page 59)

In the fall of 1877 a dispute over wages suspended work in another mine in Hidden Treasure Gulch. The men, encouraged by the foreman of the mine, moved into the tunnel where they had been working, taking with them beds, food, utensils, and a cookstove and prepared to stay until their demands were met. The owners appealed to the law and Sheriff Bullock was sent to disposses the "squatters." They refused to budge. Even United States troops did not phase them. The sheriff was then ordered to evict them, but without bloodshed. He climbed the hillside to the airshaft of the mine, from which smoke from their stove was issuing. Into the shaft he quickly dropped sulphur stink bombs and then scurried back to the mine portal to await the men who stumbled out, coughing and holding their noses.

As more mines were developed, Gayville grew until it had "250 houses and 30 business establishments" including "extensive quartz and sawmills, an assay office and a brewery", whose bottled beer sold for $4.50 a case and was claimed to be "superior" to any." Fire destroyed much of the town in August 1877, but it was immediately rebuilt.

Ten years of activity exhausted the claims around Gayville; men left, and today one of the few buildings marking the townsite houses the Lawrence County Poorhouse and Infirmary.

One month after Gayville was established, in December 1875, John B. Pearson and Frank Bryant discovered mines farther up Deadwood Gulch. Since the mining laws set up by the prospectors gave each locator 300 feet up and down the gulch from rimrock to rimrock, no sooner were claims established than mine owners got together, laid out camps, and sold lots. Several such camps sprang up on Deadwood Creek beyond Gayville and were soon known as Blacktail, South Bend, Golden Gate, Anchor City and Central City. The latter camp received its name at a public meeting called January 20, 1877, at which time I. V. Skidmore, formerly of Central City, Colorado, proposed that very name for the Dakota community.

An early photograph of the town shows at least four streets terraced along the hillside and a main street paralleling the creek and flanked by substantial business blocks. Sixteen mills served the mines—the 120-stamp DeSmet, located at the base of the hill beside the Terraville road, being one of the largest.

In 1883, just as the town had reached its peak, Deadwood Creek roared down the gulch, washing away placer workings, damaging roads, and gutting buildings. The city recovered slowly from the disaster, only to be nearly wiped out by fire. Lawrence Bellevue, who ran a restaurant, left it for a few minutes to do an errand up the gulch. As he started back he saw that his place was in flames and that adjoining buildings were catching fire. Horrified, he ran away and was never seen again. The entire town was soon ablaze. Many of the buildings destroyed were never rebuilt. Central City's boom was over.

One by one the mines were absorbed by the great Homestake Mining Company at Lead and Central became a suburb of Deadwood and Lead. Some say that if Central City had been more enterprising and had organized as a town in 1876 instead of in 1877, she might have rivaled Deadwood and have become the "metropolitan city of the Northern Hills." Who knows?

Today Central City has a population of slightly more than 400 persons. It is a quiet, pleasant town of frame and brick structures, dotted with empty, overgrown lots—landmarks left by the fire.

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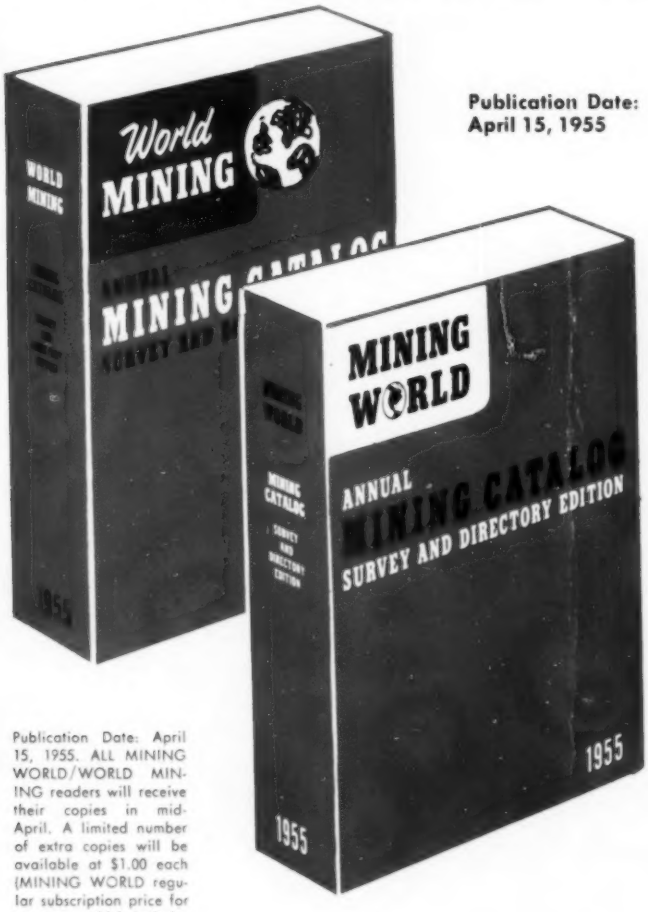

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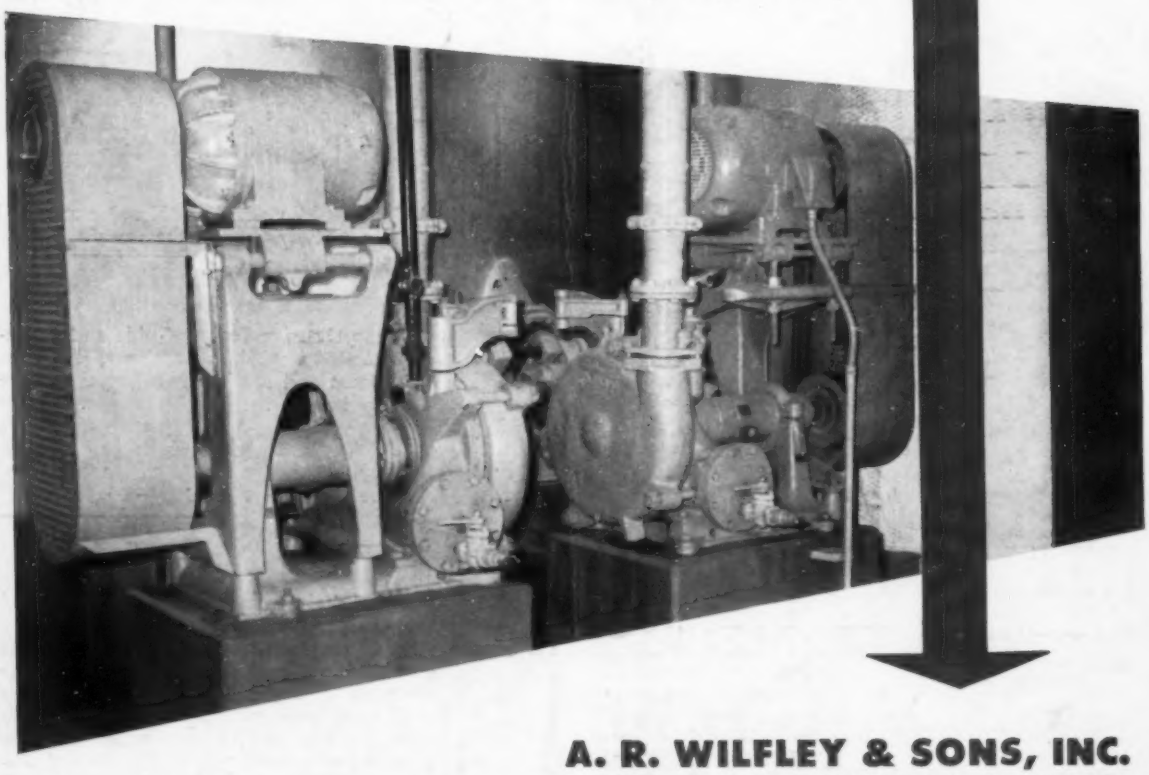

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